SOIL SURVEY
VENTURA AREA, CALIFORNIA

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
in cooperation with
UNIVERSITY OF CALIFORNIA
Agricultural Experiment Station
Issued April 1970

Major fieldwork for this soil survey was done in the period 1961-68. Soil names and descriptions were approved in 1968. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1969. This survey was made cooperatively by the Soil Conservation Service, the Calleguas, Simi Valley, and Ojai Soil Conservation Districts, Ventura County, and the University of California Agricultural Experiment Station. It is part of the technical assistance furnished to the Calleguas, Simi Valley, and Ojai Soil Conservation Districts.

Preparation of this soil survey was partly financed by the Calleguas, Simi Valley, and Ojai Soil Conservation Districts and Ventura County under provisions of an agreement with the Soil Conservation Service, U.S. Department of Agriculture.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased, on individual order, from the Cartographic Division, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, or other structures; and in determining the suitability of tracts of land for farming, industry, or recreation.

Locating Soils

All of the soils of the Ventura Area are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with a number shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in this publication. This guide lists all of the soils of the Area in alphabetic order by map symbol. It shows the page where each kind of soil is described, the capability classification and the page where the capability unit is described, and the designation for the hydrologic group in which the soil has been placed.

Many kinds of interpretative maps can be made by using information in the text and coloring the detailed soil map to show different degrees of suitability or limitation. Five sample maps of this kind have been included in this survey, following page 104. All of these maps were prepared on sheet 27 of the detailed soil map. They show shrink-swell potential, hydrologic soil groups, avocado root rot, suitability for farming, and soil erosion hazard.

Assistance in interpreting the maps or text of this soil survey can be obtained at the nearest office of the Soil Conservation Service, the office of the Soil Conservation District, or the Public Works Department of Ventura County.

Farmers and ranchers and those who work with them can learn about use and management of the soils from the soil descriptions and from the discussions of the capability groups. The capability grouping is in the section "Farm and Nonfarm Interpretations."

Community planners and others concerned with nonfarm development can read about the soil properties that affect the choice of homesites, industrial sites, schools, and parks in the section "Farm and Nonfarm Interpretations."

Engineers and builders can find under "Use of the Soils in Engineering" tables that describe soil properties that affect engineering and show the relative suitability of the soils for specified engineering purposes.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in the Ventura Area may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Additional Facts About the Area."

Cover picture: City of Camarillo in 1967. Urban and industrial development is encroaching on farmland. Camarillo Hills, Las Posas Valley, and South Mountain are in the background. Anacapa, Pico, and Sorrento soils are dominant in the valleys. Rincon and Huerhuero soils are on terraces and old alluvial fans. San Benito and Nacimiento are major soils of the upland.
Photograph by Mark Hurd Aerial Surveys, Goleta, California

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SOIL SURVEY OF THE VENTURA AREA, CALIFORNIA

BY RONALD D. EDWARDS, DANIEL F. RABEY, AND RICHARD W. KOVER, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

The Ventura Area is the southern part of Ventura County, which is in the southwestern part of California (fig. 1). The Area surveyed consists of the privately owned land south of Los Padres National Forest, except for the islands of Anacapa and San Nicholas. The total extent of the Area is 548,874 acres, or about 858 square miles.

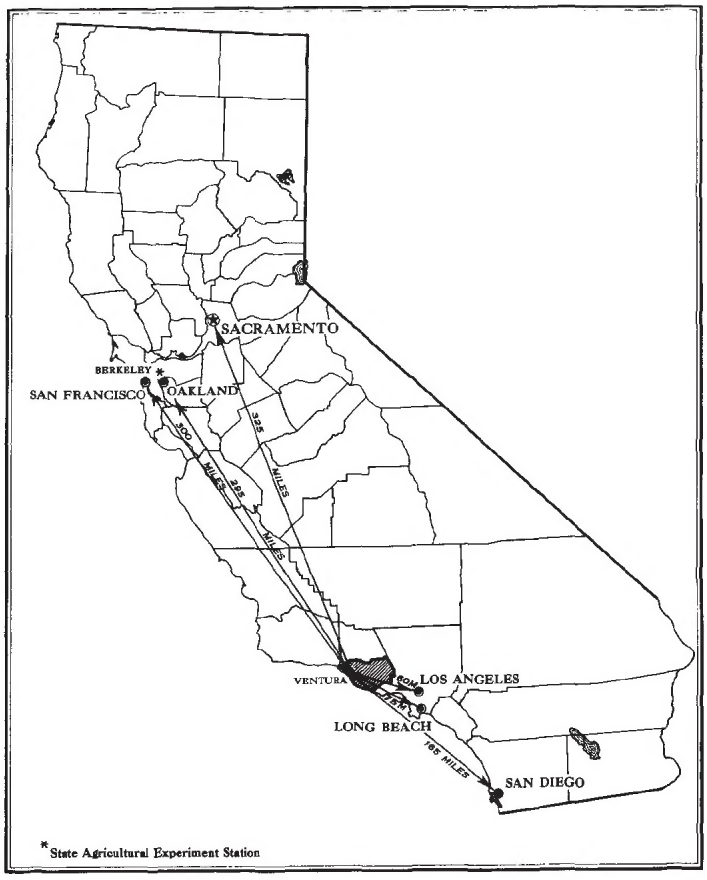

Figure 1.--Location of the Ventura Area in California.

The population of Ventura County, in January 1969, was 365,240. Oxnard, the largest incorporated city, had at that time a population of 66,890; Ventura, 51,470; the Thousand Oaks-Newbury Park area, 43,060; Camarillo, 18,630; Port Hueneme, 18,000; and Santa Paula, 17,000.

Transportation facilities include a network of highways and freeways, railway service from Oxnard and Ventura and other major centers, bus service from most cities in the Area, and scheduled air service from Ventura County Airport. A number of small airports are available for private and industrial use. Local products are exported by sea from Port Hueneme, where a shipping wharf was first constructed in 1871. Submarine pipelines from the oilfields near Ventura make possible the offshore loading of oil tankers.

Mission San Buenaventura, established in 1782, was the first permanent settlement in this Area. The mission was on the site of the present-day city of Ventura, which still retains, officially, the name San Buenaventura. Ventura County was established on January 1, 1873. Prior to that date, the area was part of Santa Barbara County.

Farming and ranching, for the sustenance of the Mission, were major activities in the early days of the settlement. By the 1830's there were 19 ranches in the county, covering altogether nearly half a million acres. Cattle, sheep, horses, and mules were raised. After 1848 ranching declined and the production of wheat, barley, corn, and other dry-farmed crops expanded. The first commercial citrus grove in the county was planted in 1874, near Santa Paula.

Irrigation on a large scale, introduced during the decade from 1880 to 1890, brought changes in agriculture. Walnuts and apricots were introduced, and for a time they were major crops. Lima beans were grown extensively, also. Production of all three of these has declined in recent years. At present, the main money crops are lemons, oranges, and tomatoes. Other vegetables, strawberries, avocados, and fresh flowers are among the significant crops. Farming is still of major importance, although urban expansion has encroached on cropland.

Oil production began in 1866. A major field north of the city of Ventura was discovered in 1925, and the oil industry is now a leading source of income. Citrus packing and vegetable processing are among the other major industries. Sand and gravel works meet local demands for aggregates. Concrete pipe used in drainage systems and irrigation systems is manufactured locally. Light manufacturing and research industries have been moving into the Conejo Valley and the vicinity of Oxnard.

Navy installations at Port Hueneme and Point Mugu and an Air Force base at Camarillo have affected the economy of the county by accelerating the demand for housing and for commercial services.

HOW THIS SURVEY WAS MADE

Soil scientists made this survey to learn what kinds of soils are in the Ventura Area, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. As they traveled over the county, they observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series and the soil phase are the categories of soil classification most used in a local survey (10). 1/

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Calleguas and Camarillo, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Calleguas shaly loam, 9 to 30 percent slopes, eroded, is one of two phases within the Calleguas series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of the Ventura Area: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils joined by a hyphen. Castaic-Balcom complex, 15 to 30 percent slopes, is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Castaic and Saugus soils, 30 to 75 percent slopes, eroded, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Sedimentary rock land is a land type in the Ventura Area.

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of rangeland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

1/ Underscored numbers in parentheses refer to Literature Cited, page 145.

GENERAL SOIL MAP

The general soil map in this publication shows, in color, the soil associations in the Ventura Area. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in an area, who want to compare different parts of an area, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is also useful in determining the value of an association for a watershed, for wildlife habitat, for engineering projects, for recreational areas, and for community development. A general soil map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The 14 soil associations in the Ventura Area are described in the following paragraphs. Four of the associations are on alluvial fans and plains and in basins, two are on terraces, and eight are on uplands.

Level to Moderately Sloping, Excessively Drained to Poorly Drained Soils of the Alluvial Fans, Plains, and Basins

These soils are well-drained to excessively drained loamy sands to silty clay loams on alluvial fans and plains, and poorly drained loamy sands to silty clay loams in basins. They formed in alluvium derived predominantly from sedimentary rocks and to a lesser extent from basic igneous rocks.

These soils are on the Oxnard Plain, in Conejo Valley, Hidden Valley, Las Posas Valley, Ojai Valley, Pleasant Valley, Russell Valley, Santa Rosa Valley, Simi Valley, Tierra Rejada Valley, and the Santa Clara and Ventura River valleys. Elevations range from sea level to 1,700 feet. The annual rainfall commonly ranges from 14 to 20 inches, and the frost-free season from 280 to 350 days. The average annual air temperature is between 59° and 62° F.

The soils in this group are used extensively for cultivated crops and orchards and for urban development. In uncultivated areas the vegetation consists of annual grasses, forbs, brush, and scattered oaks.

Four of the associations in the Ventura Area are in this group. They make up 33 percent of the Area and include most of the cultivated acreage.

1. Pico-Metz-Anacapa Association

Level to moderately sloping, very deep, well-drained sandy loams and very deep, somewhat excessively drained loamy sands

The main areas of this association are in Las Posas Valley, Pleasant Valley, Santa Rosa Valley, and the Santa Clara and Ventura River valleys. The soils formed in deep alluvium derived predominantly from sedimentary rocks. The plant cover in uncultivated areas consists of annual grasses, forbs, and scattered oaks. Slopes range from 0 to 9 percent. Elevations range from 25 to 1,000 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from about 300 to 350 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 7 percent of the survey Area. Pico soils make up about 30 percent of the association, Metz soils about 30 percent, and Anacapa soils about 20 percent. Cortina and Corralitos soils make up the remaining 20 percent.

Pico, Metz, and Anacapa soils are 60 inches or more deep. Pico soils are well drained and have a surface layer of grayish-brown, calcareous sandy loam underlain by light brownish-gray, calcareous loam and sandy loam. Metz soils are somewhat excessively drained and have a surface layer of pale-brown, calcareous loamy sand underlain by light brownish-gray, calcareous, stratified sand and sandy loam. Anacapa soils are well drained and have a surface layer of grayish-brown, neutral to moderately alkaline sandy loam underlain by grayish-brown, moderately alkaline, calcareous coarse sandy loam.

The soils of this association are some of the most productive in the survey Area. They are used for irrigated vegetables, citrus crops and field crops, strawberries, walnuts, and avocados, and to a lesser extent for range. Some areas have been used for urban development.

2. Mocho-Sorrento-Garretson Association

Level to moderately sloping, very deep, well-drained loams to silty clay loams

The main areas of this association are in Conejo Valley, Hidden Valley, Las Posas Valley, Russell Valley, Simi Valley, and the Santa Clara and Ventura River valleys. The soils formed in deep alluvium derived predominantly from sedimentary rocks. The plant cover in uncultivated areas consists of annual grasses, forbs, and scattered

oaks. Slopes range from 0 to 9 percent. Elevations range from 25 to 1,700 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from about 280 to 350 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 14 percent of the survey Area. Mocho soils make up about 35 percent of the association, Sorrento soils about 25 percent, and Garretson soils about 10 percent. Cropley, Salinas, Vina, and Zamora soils make up the remaining 30 percent.

Mocho, Sorrento, and Garretson soils are well drained and are 60 inches or more deep. Mocho soils have a surface layer of grayish-brown, calcareous loam underlain by grayish-brown and light grayish-brown, calcareous loam. Sorrento soils have a surface layer of grayish-brown, neutral to mildly alkaline loam underlain by grayish-brown and light brownish-gray, moderately alkaline loam that is calcareous in the lower part. Garretson soils have a surface layer of grayish-brown and yellowish-brown, slightly acid loam underlain by yellowish-brown and pale-brown, mildly alkaline loam and gravelly fine sandy loam.

The soils of this association are some of the most productive in the survey Area. They are used for irrigated vegetables, citrus crops and field crops, walnuts, and avocados. Some areas are used for range, and some for urban development.

3. Camarillo-Hueneme-Pacheco Association

Level and nearly level, very deep, poorly drained loamy sands to silty clay loams

This association occurs mainly on the Oxnard Plain. The soils formed in deep, stratified alluvium derived predominantly from sedimentary rocks. The plant cover in uncultivated areas consists of salt-tolerant grasses, forbs, and shrubs. Slopes range from 0 to 2 percent. Elevations range from 25 to 250 feet. The annual rainfall is 14 to 16 inches, and the frost-free season 300 to 350 days. The average annual air temperature is 59° or 60° F.

This association occupies about 8 percent of the survey Area. Camarillo soils make up about 55 percent of the association, Hueneme soils about 30 percent, and Pacheco soils about 15 percent.

Camarillo, Hueneme, and Pacheco soils are poorly drained and are 60 or more inches deep. Camarillo soils have a surface layer of grayish-brown, calcareous sandy loam underlain by mottled grayish-brown, pale-brown, and light-gray, calcareous fine sand to fine sandy clay loam. Hueneme soils have a surface layer of grayish-brown, calcareous loamy fine sand and light sandy loam underlain by mottled grayish-brown and light-gray, calcareous sandy loam, loamy sand, and sand. Pacheco soils have a surface layer of dark-gray, mildly and strongly alkaline silty clay loam that becomes calcareous in the lower part. The underlying layer is mottled light brownish-gray, calcareous silty clay loam.

The soils of this association are some of the most productive in the survey Area. They are used for irrigated vegetables, field crops, lemons, and strawberries, and for urban development. Most areas are artificially drained. In undrained areas there is a seasonal water table within a depth of 2 feet. Periodically the soils contain soluble salts.

4. Riverwash-Sandy Alluvial Land-Coastal Beaches Association

Level to gently sloping, excessively drained to poorly drained, stratified sandy, gravelly, and cobbly material.

The main areas of this association are in the Santa Clara and Ventura River valleys and along the coast from Point Mugu to the mouth of the Ventura River. The soils formed in deep alluvium derived predominantly from sedimentary rocks. The plant cover consists of annual grasses, beach grasses, brush, willows, and scattered cottonwoods. Slopes range from 0 to 5 percent. Elevations range from sea level to 800 feet. The annual rainfall is 14 to 17 inches, and the frost-free season is about 300 to 350 days. The average annual air temperature is between 59° and 62° F.

This association occupies about 4 percent of the survey Area. Riverwash makes up about 35 percent of the association, Sandy alluvial land about 30 percent, and Coastal beaches about 15 percent. Fill land and Tidal flats make up the remaining 20 percent.

Riverwash and Sandy alluvial land are excessively drained. Coastal beaches has variable drainage. All consist of highly stratified, water- and wind-deposited, stony, cobbly, and gravelly sand, loamy sand, and sandy loam. They contain only a small amount of silt and clay. They are subject to flooding, scouring, and deposition during and immediately following storms.

The areas in this association have little or no value for farming. They are used mainly for recreation and for watershed. Limited acreages of Sandy alluvial land are used for range, for citrus crops, and for urban development.

Level to Moderately Steep, Well Drained and Moderately Well Drained Soils of the Terraces

The soils in this group are well drained and moderately well drained very fine sandy loams to silty clay loams that have a moderately slowly to very slowly permeable sandy clay loam to sandy clay subsoil. Most of these soils formed on old terraces, in alluvium derived from sedimentary rocks. A few formed on old alluvial fans.

These soils are in Conejo Valley, Las Posas Valley, Ojai Valley, Upper Ojai Valley, Santa Ana Valley, Santa Rosa Valley, Simi Valley, Tierra Rejada Valley, and the Santa Clara River valley. They are also on Las Posas Heights and in the area

north of Moorpark. Elevations range from 100 to 1,700 feet. The annual rainfall commonly ranges from 14 to 21 inches, and the frost-free season from 250 to 330 days. The average annual air temperature is between 60° and 62° F.

The soils in this group are used for range and dryland pasture, for watershed, for citrus crops and field crops, and for urban development. In uncultivated areas the vegetation consists of annual grasses, forbs, brush, and scattered oaks.

Two of the associations in the Ventura Area are in this group. They make up about 7 percent of the Area.

5. Rincon-Huerhuero-Azule Association

Level to moderately steep, very deep, well drained and moderately well drained very fine sandy loams to silty clay loams that have a slowly and very slowly permeable sandy clay subsoil

The main areas of this association are in Conejo Valley, Las Posas Valley, Santa Rosa Valley, Simi Valley, Tierra Rejada Valley, and the Santa Clara River valley, on Las Posas Heights, and in the area separating South Mountain, Oak Ridge, and Moorpark. The soils formed in alluvium derived predominantly from sedimentary rocks. The plant cover in uncultivated areas consists of annual grasses, forbs, brush, and scattered oaks. Slopes range from 0 to 30 percent. Elevations range from 100 to 500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from about 250 to 330 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 5 percent of the survey Area. Rincon soils make up about 35 percent of the association, Huerhuero soils about 30 percent, and Azule soils about 20 percent. Chesterton and Soper soils make up the remaining 15 percent.

Rincon soils are well drained and are 60 inches or more deep. They have a surface layer of dark-gray, slightly acid silty clay loam. The subsoil is dark grayish-brown and brown, neutral to moderately alkaline sandy clay and sandy clay loam that becomes calcareous with increasing depth. The substratum is yellowish-brown, calcareous, stratified sandy clay loam and sandy loam.

Huerhuero soils are moderately well drained and have an effective rooting depth of 8 to 30 inches. They have a surface layer of grayish-brown and dark grayish-brown, slightly acid very fine sandy loam. This layer is underlain by a thin layer of gray, medium acid very fine sandy loam. The subsoil is brown and pale-brown, neutral and moderately alkaline sandy clay and sandy clay loam. The substratum is brown, moderately alkaline, calcareous very fine sandy loam.

Azule soils are well drained and are 60 inches or more deep. They have a surface layer of grayish-brown, medium acid loam abruptly underlain by a subsoil of brown, slightly acid sandy clay. The substratum is brown, mildly alkaline sandy clay loam.

The soils of this association are used for range, for citrus crops and field crops, and for urban development. The lesser slopes are also used for vegetables.

6. Ojai-Sorrento, Heavy Variant, Association

Level to moderately steep, very deep, well-drained very fine sandy loams and clay loams that have a slowly and moderately slowly permeable sandy clay loam and heavy clay loam subsoil

The main areas of this association are in Ojai Valley, Santa Ana Valley, and Upper Ojai Valley. The soils formed on fans and terraces, in alluvium derived predominantly from sedimentary rocks. The plant cover in uncultivated areas consists of annual grasses, brush, and scattered oaks. Slopes range from 0 to 30 percent. Elevations range from 25 to 1,700 feet. The annual rainfall ranges from 14 to 21 inches, and the frost-free season from about 250 to 300 days. The average annual air temperature is about 61° F.

This association occupies about 2 percent of the survey Area. Ojai soils make up about 65 percent of the association, and Sorrento soils, heavy variant, about 25 percent. Kimball soils make up the remaining 10 percent.

Ojai soils are well drained and are 60 inches or more deep. They have a surface layer of brown, medium acid and slightly acid very fine sandy loam. The subsoil is reddish-brown, slightly acid light to heavy sandy clay loam. The substratum is light reddish-brown, slightly acid very cobbly and gravelly light clay.

Sorrento soils, heavy variant, also are well drained and are 60 inches or more deep. They have a surface layer of dark grayish-brown, slightly acid clay loam. The subsoil is dark grayish-brown, neutral heavy clay loam. The substratum is brown, moderately alkaline heavy clay loam.

The soils of this association are used for range, for field crops and citrus crops, and for urban development.

Moderately Sloping to Very Steep, Well-Drained and Excessively Drained Soils of the Uplands

The soils of the uplands are well-drained to excessively drained sands to silty clay loams. They are shallow to very deep over softly consolidated sediments, sandstone, shale, or basic igneous rocks.

These soils are in the hills west of the Ventura River and north of the Santa Clara River, and on South Mountain, Oak Ridge, Santa Susana Mountains, Simi Hills, and Santa Monica Mountains. Elevations range from 50 to 3,000 feet. The annual rainfall commonly ranges from 14 to 22 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is between 60° and 62° F.

The soils in this group are used for range, for watershed, and for urban development. The lesser slopes are used for orchards and field crops. In uncultivated areas the vegetation consists of annual grasses, forbs, brush, and scattered oaks.

Eight associations in the Ventura Area are in this group. They make up about 60 percent of the Area.

7. San Benito-Nacimiento-Linne Association

Strongly sloping to very steep, well-drained clay loams and silty clay loams that are moderately deep to deep over shale or sandstone

The main areas of this association are in the uplands north of the Santa Clara River, on South Mountain and Oak Ridge, and around Erbes Road in Thousand Oaks. The soils are underlain by softly consolidated sediments or by soft to firm shale or sandstone. The plant cover in uncultivated areas consists of annual grasses, forbs, brush, and scattered oaks. Slopes range from 9 to 75 percent. Elevations range from 100 to 2,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from about 260 to 300 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 15 percent of the survey Area. San Benito soils make up about 40 percent of the association, Nacimiento soils about 20 percent, and Linne soils about 15 percent. Diablo and Soper soils make up the remaining 25 percent.

San Benito soils are well drained and are 48 to 60 inches or more deep. They have a surface layer of dark grayish-brown, moderately alkaline clay loam and a substratum of grayish-brown and light yellowish-brown, calcareous clay loam. They are underlain by softly consolidated sediments.

Nacimiento soils are well drained and are 24 to 40 inches deep. They are grayish-brown, calcareous silty clay loam throughout the profile. They are underlain by firm, calcareous shale.

Linne soils are well drained and are 24 to 48 inches deep. They have a surface layer of gray, calcareous silty clay loam. The next layer is light brownish-gray, calcareous silty clay loam. Below this is calcareous shale.

The soils of this association are used for range, for watershed, for citrus crops, field crops, and avocados, and for urban development.

8. Castaic-Balcom-Saugus Association

Moderately sloping to very steep, well-drained sandy loams to silty clay loams that are moderately deep to deep over sandstone and shale

The main areas of this association are on both sides of the Santa Clara River and at the Los Angeles County line, north of the town of Piru, on the northern and southern slopes of South Mountain, and on the southern slopes of Sulphur Mountain in the Wheeler Canyon area. At a depth of more than 20 inches, the soils are underlain by soft shale or sandstone. The plant cover in uncultivated areas consists of annual grasses, brush, and scattered oaks. Slopes range from 9 to 75 percent. Elevations range from 50 to 2,500 feet. The annual rainfall is 14 to 20 inches, and the frost-free season is about 250 to 300 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 8 percent of the survey Area. Soils in the Castaic-Balcom complex make up about 45 percent of the association; Castaic and Saugus soils about 35 percent; and Saugus soils about 10 percent. Badland, Landslides, and Terrace escarpments make up the remaining 10 percent.

Castaic soils are well drained and are 22 to 40 inches deep. They have a surface layer of grayish-brown, slightly acid and neutral silty clay loam. Below this is light brownish-gray, calcareous shale that crushes easily to silty clay loam.

Balcom soils are well drained and are 22 to 40 inches deep. They have a surface layer of grayish-brown and light brownish-gray, calcareous loam. Below this is pale-olive, calcareous shale that crushes easily to loam.

Saugus soils are well drained and are 48 to 60 inches deep. They have a surface layer of brown and yellowish-brown, neutral and slightly acid sandy loam. The substratum is light yellowish-brown, slightly acid sandy loam that grades to pale-brown, slightly acid, firm sandstone.

The soils of this association are used for range, for watershed, for citrus crops and field crops, and for urban development.

9. Calleguas-Arnold Association

Strongly sloping to steep, well-drained shaly loams that are shallow over shale or sandstone, and somewhat excessively drained sands that are very deep over sandstone

The main areas of this association are on the southwestern slopes of Sulphur Mountain and the northwestern slopes of South Mountain, on Oak Ridge, and on the hills around Simi Peak. The soils are underlain by soft sandstone and hard shale. The plant cover consists of annual grasses, forbs, and brush. Slopes range from 9 to 50 percent. Elevations range from 100 to 2,200 feet. The annual rainfall is 14 to 20 inches, and the frost-free season about 250 to 300 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 9 percent of the survey Area. Calleguas soils make up about 55 percent of the association, soils in the Calleguas-Arnold complex about 20 percent, and Arnold soils about 5 percent. San Andreas soils, Badland,

Landslides, and Gullied land make up most of the remaining 20 percent.

Calleguas soils are well drained and are less than 20 inches deep. They have a surface layer of pale-brown, calcareous shaly loam underlain by pale-brown, calcareous very shaly loam. Below this is hard, fractured, calcareous shale.

Arnold soils are somewhat excessively drained and are 60 inches or more deep. They have a surface layer of light brownish-gray, slightly acid sand underlain by very pale brown, medium acid and strongly acid sand and fine sand. The underlying sandstone is soft enough that it does not adversely affect root and water penetration.

The soils of this association are used for range and for watershed. Urban use is increasing on the more gentle slopes.

10. Gazos-Santa Lucia Association

Moderately steep to very steep, well-drained silty clay loams and shaly silty clay loams that are moderately deep to deep over fractured shale

The main areas of this association are on Sulphur Mountain, Oak Ridge, and along the southeast Los Angeles-Ventura County line. At a depth of more than 20 inches, the soils are underlain by shale. The plant cover in uncultivated areas consists of annual grasses, brush, and scattered oaks. Slopes range from 15 to 75 percent. Elevations range from 100 to 2,500 feet. The annual rainfall is 14 to 22 inches, and the frost-free season about 250 to 300 days. The average annual air temperature is between 60° and 62° F.

This association occupies about 3 percent of the survey Area. Gazos soils make up about 70 percent of this association, and Santa Lucia soils about 20 percent. Badland and Gullied land make up the remaining 10 percent.

Gazos soils are well drained and are 24 to 46 inches deep. They have a surface layer of grayish-brown, neutral silty clay loam underlain by light brownish-gray and pale-brown, slightly acid and medium acid very shaly silty clay loam. Below this is fractured shale.

Santa Lucia soils are well drained and are 20 to 36 inches deep. They have a surface layer of dark-gray and gray, medium acid shaly silty clay loam underlain by gray, medium acid very shaly silty clay loam. They are 15 to 50 percent shale throughout the profile. The underlying material is fractured, diatomaceous shale.

The soils of this association are used mainly for range and for watershed. The more gentle slopes are used for urban development and for citrus crops.

11. Millsholm-Malibu-Los Osos Association

Strongly sloping to very steep, well-drained loams and clay loams that have a clay loam and clay subsoil and are shallow to deep over sandstone and shale

The main areas of this association are in the Santa Monica Mountains, between Point Mugu and the Los Angeles County line, north of the towns of Piru and Fillmore, and on Sulphur Mountain, Red Mountain, and the Simi Hills. The soils are underlain by sandstone and shale. The plant cover in uncultivated areas consists of annual grasses, forbs, brush, and scattered oaks. Slopes range from 9 to 75 percent. Elevations range from 100 to 2,500 feet. The annual rainfall is 14 to 20 inches, and the frost-free season is about 250 to 300 days. The average annual air temperature is 60° F.

This association occupies about 6 percent of the survey Area. Millsholm soils make up about 40 percent of the association, Malibu soils about 10 percent, Los Osos soils about 15 percent, and soils in the Millsholm-Malibu complex about 25 percent. Sedimentary rock land and Gullied land make up the remaining 10 percent.

Millsholm soils are well drained and are less than 20 inches deep. They have a surface layer of brown, medium acid loam and a subsoil of brown, medium acid light clay loam. They are underlain by hard, well-fractured shale and sandstone.

Malibu soils are well drained and are 23 to 36 inches deep. They have a surface layer of brown, medium acid loam abruptly underlain by a yellowish-red, medium acid clay subsoil. Below this is hard, fractured shale and sandstone.

Los Osos soils are well drained and are 22 to 48 inches deep. They have a surface layer of dark-brown, slightly acid clay loam and a subsoil of dark-brown, slightly acid and neutral clay. They are underlain by decomposing shale.

The soils of this association are used mainly for range and for watershed. The lesser slopes are used for citrus crops and field crops and for urban purposes.

12. Sespe-Lodo Association

Moderately steep to very steep, well-drained clay loams that are moderately deep to deep over sandstone or shale, and somewhat excessively drained loams that are shallow over shale

The main areas of this association are in the hills between Ojai Valley and Upper Ojai Valley, on Red Mountain, and along the northwest boundary of the survey Area. The soils are underlain

by hard sandstone and shale. The plant cover in uncultivated areas consists of annual grasses, brush, and scattered oaks. Slopes range from 15 to 75 percent. Elevations range from 300 to 2,600 feet. The annual rainfall is 18 to 22 inches, and the frost-free season is about 250 to 280 days. The average annual air temperature is 61° F.

This association occupies about 4 percent of the survey Area. Sespe soils make up about 60 percent of the association, and Lodo soils about 25 percent. Sedimentary rock land, Gullied land, and Terrace escarpments make up the remaining 15 percent.

Sespe soils are well drained and are 24 to 48 inches deep. They have a surface layer of brown, medium acid clay loam and a subsoil of reddish-brown, slightly acid sandy clay. They are underlain by hard sandstone.

Lodo soils are somewhat excessively drained and are less than 20 inches deep. They have a surface layer of reddish-brown, slightly acid heavy loam and medium acid gravelly light clay loam underlain by hard, fractured, reddish-brown shale. Rock outcrop covers 2 to 10 percent of the area.

The soils of this association are used primarily for range and for watershed. The lower slopes are used for citrus crops and for urban development.

13. Sedimentary Rock Land-Gaviota Association

Moderately steep to very steep, excessively drained rock land and well-drained sandy loams that are shallow over sandstone

The main areas of this association are on the Santa Susana Mountains, the hills north of the town of Piru, and the south face of Sulphur Mountain. At a depth of less than 20 inches, these soils are underlain by sandstone and shale. The plant cover consists of annual grasses, brush, and scattered oaks. Slopes range from 15 to 75 percent. Elevations range from 100 to 2,500 feet. The annual rainfall is 15 to 20 inches, and the frost-free season is about 250 to 270 days. The average annual air temperature is 60° F.

This association occupies about 6 percent of the survey Area. Sedimentary rock land makes up about 55 percent of the association, and Gaviota soils about 30 percent. Badland and Gullied land make up the remaining 15 percent.

Sedimentary rock land is excessively drained. It has a thin mantle of relatively stable soil material. Rock outcrop covers more than 25 percent of the area. This land type is typically nearly barren or has only sparse brush cover.

Gaviota soils are well drained. They have a surface layer of yellowish-brown, neutral sandy loam and are underlain by sandstone rock at a depth of 8 to 20 inches. Rock outcrop covers about 5 to 10 percent of the area.

The soils of this association are used for watershed and for range.

14. Hambright-Igneous Rock Land-Gilroy Association

Rock land and strongly sloping to very steep, well-drained clay loams that are shallow to moderately deep over basic igneous rock

This association is in the southeastern corner of the survey Area, between the Oxnard Plain and the Los Angeles County line. The plant cover in uncultivated areas consists of annual grasses, brush, and scattered oaks. Slopes range from 9 to 75 percent. Elevations range from 100 to 3,000 feet. The annual rainfall is 15 to 22 inches, and the frost-free season is about 250 to 300 days. The average annual air temperature is 61° or 62° F.

This association occupies about 9 percent of the survey Area. Hambright soils make up about 45 percent of the association, Igneous rock land about 20 percent, and Gilroy soils about 15 percent. Cibo soils and Gullied land make up the remaining 20 percent.

Hambright soils are well drained and are less than 20 inches deep. They have a surface layer of brown, medium acid heavy loam and a subsoil of brown, medium acid and neutral clay loam and stony clay loam. They are underlain by hard volcanic rock. Rock outcrop covers 2 to 25 percent of the area.

Igneous rock land has variable drainage. It has a thin mantle of relatively stable soil material. Rock outcrop covers 25 percent of the area. This land type is typically barren or has only sparse brush cover.

Gilroy soils are well drained and are 21 to 40 inches deep. They have a surface layer of dark grayish-brown, medium acid clay loam and a subsoil of brown, medium acid clay loam. They are underlain by basic igneous rock. Rock outcrop covers 10 to 25 percent of some areas.

The soils of this association are used primarily for watershed and for range. The lesser slopes are used for lemons, for field crops, and for urban development.

This section describes the soil series and the individual soils, or mapping units, of the Ventura Area. The approximate acreage and the proportionate extent of each soil are given in table 1.

The method is to describe the more easily observed features and geographic setting of each soil series, and then the soils, or mapping units, in the series. The first mapping unit following the soil series is described in detail, and the other mapping units, mainly by referring to the first one. The first mapping unit following the soil series contains a description of a soil profile that is representative for the series. This profile is described first in general terms, and then in detailed technical terms. The technical description is intended for soil scientists and engineers who need to make highly detailed interpretations.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of the description of each mapping unit is the capability unit in which it has been placed. The page on which a given capability unit is described can be found readily by referring to the "Guide to Mapping Units" at the back of this survey.

Many terms used in the descriptions of soil series and mapping units, and in other sections of the survey, are defined in the Glossary. Unless otherwise indicated, the colors mentioned are for dry soils.

Anacapa Series

The Anacapa series consists of well-drained sandy loams and gravelly sandy loams 60 inches or more deep. These soils formed on alluvial fans and plains, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 500 feet. The annual rainfall ranges from 14 to 17 inches, and the frost-free season from 300 to 330 days. The average annual air temperature is 60° F. The vegetation is annual grasses and forbs.

Anacapa soils occur with Mocho and Sorrento soils. They are used mainly for vegetables and for citrus crops. Small acreages are in field crops and range. Urban use is increasing.

Anacapa sandy loam, 0 to 2 percent slopes (AcA).--This is a level to nearly level soil of the alluvial fans and alluvial plains.

The surface layer is grayish-brown, neutral and mildly alkaline sandy loam about 35 inches thick. It is underlain by grayish-brown, moderately alkaline, calcareous coarse sandy loam.

Representative profile located about 2,640 feet west and 300 feet south of intersection of Gonzales Road and Ventura Road, near city of Oxnard.

Ap--0 to 5 inches, grayish-brown (2.5Y 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; cloddy; slightly hard, very friable, nonsticky and nonplastic; very few micro roots; many micro irregular pores; neutral (pH 7.0); abrupt, smooth boundary.

A12--5 to 24 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; very few micro roots; many micro irregular pores; neutral (pH 7.0); gradual, smooth boundary.

A13--24 to 35 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, non sticky and nonplastic; very few micro roots; many micro irregular pores; mildly alkaline (pH 7.5); clear, smooth boundary.

Cca--35 to 60 inches, grayish-brown (10YR 5/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; very few micro roots; many micro irregular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and in filaments.

The A horizon is grayish brown or dark grayish brown in hues of 10YR and 2.5Y. This horizon is typically sandy loam in texture but in places is loam. It ranges from 21 to 41 inches in thickness. The uppermost few inches tends to be cloddy, as a result of repeated disking. The uppermost part is neutral to mildly alkaline and is noncalcareous. In places the lower part is calcareous. The C horizon is light brownish gray, grayish brown, or brown in hues of 10YR and 2.5Y. This horizon is coarse sandy loam or loam in texture. In places it is stratified below a depth of 40 inches. Reaction is moderately alkaline in the C horizon. All parts of the C horizon are calcareous; lime occurs in both disseminated and segregated forms.

Included with this soil in mapping were small areas of Anacapa sandy loam, 2 to 9 percent slopes; Mocho loam; Pacheco silty clay loam; Pico sandy loam; and Sorrento loam.

Permeability is moderately rapid. Surface runoff is slow, and there is no erosion hazard. The available water holding capacity is 6.5 to 7.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for vegetables and for citrus crops. Urban use is increasing. Capability unit IIs-4.

Anacapa sandy loam, 2 to 9 percent slopes (AcC).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Anacapa sandy loam, 0 to 2 percent slopes (AcA), mainly in having steeper slopes.

Included with this soil in mapping were areas of Metz loamy sand; Camarillo sandy loam; Mocho loam; and an unnamed sandy loam that has a dark-colored surface layer, is less than 20 inches thick, and is

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Soil	Area	Extent	Soil	Area	Extent
	Acres	Percent		Acres	Percent
Anacapa sandy loam, 0 to 2 percent slopes	2,345	0.4	Diablo clay, 30 to 50 percent slopes	1,870	0.4
Anacapa sandy loam, 2 to 9 percent slopes	4,200	.8	Fill land	2,636	.5
Anacapa gravelly sandy loam, 2 to 9 percent slopes	1,810	.3	Garretson loam, 0 to 2 percent slopes	377	.1
Arnold sand, 9 to 50 percent slopes	1,504	.3	Garretson loam, 2 to 9 percent slopes	5,200	.9
Azule loam, 0 to 5 percent slopes	670	.1	Garretson gravelly loam, 2 to 9 slopes	2,320	.4
Azule loam, 2 to 9 percent slopes, eroded	1,867	.4	Garretson silt loam, calcareous variant, 2 to 5 percent slopes	1,875	.3
Azule loam, 9 to 15 percent slopes	2,124	.4	Gaviota rocky sandy loam, 15 to 50 percent slopes	8,820	1.6
Azule gravelly loam, 5 to 9 percent slopes	1,020	.2	Gazos silty clay loam, 15 to 30 percent slopes	890	.2
Badland	24,200	4.4	Gazos silty clay loam, 30 to 50 percent slopes	4,742	.9
Calleguas shaly loam, 9 to 30 percent slopes, eroded	417	.1	Gazos silty clay loam, 50 to 75 percent slopes	4,818	.9
Calleguas shaly loam, 30 to 50 percent slopes	24,080	4.4	Gilroy clay loam, 9 to 15 percent slopes	2,258	.4
Calleguas-Arnold complex, 30 to 50 percent slopes, eroded	10,410	1.9	Gilroy clay loam, 15 to 30 percent slopes	3,270	.6
Camarillo sandy loam	5,490	1.0	Gilroy very rocky clay loam, 15 to 50 percent slopes	3,285	.6
Camarillo loam	14,640	2.7	Gullied land	4,020	.7
Camarillo loam, sandy substratum	4,736	.9	Hambright very rocky loam, 15 to 75 percent slopes	20,395	3.7
Castaic-Balcom complex, 9 to 15 percent slopes, eroded	368	.1	Hambright rocky clay loam, 30 to 50 percent slopes	1,880	.4
Castaic-Balcom complex, 15 to 30 percent slopes	1,047	.2	Hueneme loamy sand, loamy substratum	1,410	.3
Castaic-Balcom complex, 30 to 50 percent slopes, eroded	15,990	2.9	Hueneme sandy loam	10,600	1.9
Castaic-Balcom complex, 50 to 65 percent slopes, eroded	3,832	.7	Huerhuero very fine sandy loam, 0 to 5 percent slopes	2,043	.4
Castaic and Saugus soils, 30 to 75 percent slopes, eroded	15,350	2.8	Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded	2,757	.5
Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded	1,318	.3	Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded	2,220	.4
Chesterton sandy loam, 9 to 30 percent slopes, severely eroded	1,020	.2	Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded	518	.1
Cibo clay, 5 to 15 percent slopes	470	.1	Igneous rock land	10,960	2.0
Cibo clay, 15 to 30 percent slopes	1,002	.2	Kimball sandy loam, 2 to 9 percent slopes, eroded	753	.1
Coastal beaches	3,275	.6	Kimball sandy loam, 9 to 15 percent slopes, eroded	186	(1/)
Corralitos loamy sand, 0 to 2 percent slopes	760	.1	Landslides	1,074	.2
Corralitos loamy sand, 2 to 9 percent slopes	1,232	.2	Linne silty clay loam, 9 to 15 percent slopes, eroded	1,290	.2
Cortina stony sandy loam, 2 to 9 percent slopes	4,875	.9	Linne silty clay loam, 15 to 30 percent slopes, eroded	3,360	.6
Cortina very stony sandy loam, 9 to 15 percent slopes	1,177	.2	Linne silty clay loam, 30 to 50 percent slopes, eroded	8,094	1.5
Cropley clay, 0 to 2 percent slopes	3,325	.6	Lodo rocky loam, 30 to 50 percent slopes	4,800	.9
Cropley clay, 2 to 9 percent slopes	5,743	1.0	Los Osos clay loam, 9 to 15 percent slopes, eroded	635	.1
Cropley clay, calcareous variant	1,367	.3	Los Osos clay loam, 15 to 30 percent slopes, eroded	1,600	.3
Diablo clay, 9 to 15 percent slopes	1,587	.3			
Diablo clay, 15 to 30 percent slopes	2,230	.4			

See footnote at end of table.

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Soil	Area	Extent	Soil	Area	Extent
	Acres	Percent		Acres	Percent
Los Osos clay loam, 30 to 50 percent slopes	2,775	0.5	Rincon silty clay loam, 9 to 15 percent slopes, eroded	2,248	0.4
Malibu loam, 9 to 15 percent slopes, eroded	189	(1/)	Rincon silty clay loam, 15 to 30 percent slopes, eroded	3,430	.6
Malibu loam, 15 to 30 percent slopes, eroded	816	.1	Rincon silty clay loam, 9 to 30 percent slopes, severely eroded	580	.1
Malibu loam, 30 to 50 percent slopes	3,275	.6	Riverwash	7,118	1.3
Metz loamy fine sand, 0 to 2 percent slopes	2,076	.4	Salinas clay loam, 0 to 2 percent slopes	1,335	.2
Metz loamy fine sand, 2 to 9 percent slopes	838	.2	Salinas clay loam, 2 to 9 percent slopes	2,570	.5
Metz loamy sand, 0 to 2 percent slopes	5,515	1.0	San Andreas sandy loam, 30 to 50 percent slopes	5,427	1.0
Metz loamy sand, 2 to 9 percent slopes	1,305	.2	San Benito clay loam, 9 to 15 percent slopes, eroded	1,654	.3
Metz loamy sand, loamy substratum, 0 to 2 percent slopes	837	.2	San Benito clay loam, 15 to 30 percent slopes, eroded	4,978	.9
Millsholm loam, 15 to 50 percent slopes	4,865	.9	San Benito clay loam, 30 to 50 percent slopes, eroded	17,568	3.2
Millsholm very rocky loam, 30 to 75 percent slopes	7,470	1.4	San Benito clay loam, 50 to 75 percent slopes	8,537	1.6
Millsholm-Malibu complex, 30 to 50 percent slopes, eroded	8,272	1.5	Sandy alluvial land	6,178	1.1
Mocho loam, 0 to 2 percent slopes	13,226	2.4	Santa Lucia shaly silty clay loam, 15 to 30 percent slopes	1,166	.2
Mocho loam, 2 to 9 percent slopes	7,087	1.3	Santa Lucia shaly silty clay loam, 30 to 50 percent slopes	792	.1
Mocho gravelly loam, 2 to 9 percent slopes	2,776	.5	Santa Lucia shaly silty clay loam, 50 to 75 percent slopes	482	.1
Mocho clay loam, 0 to 2 percent slopes	3,068	.6	Saugus sandy loam, 5 to 30 percent slopes	1,160	.2
Mocho clay loam, 2 to 5 percent slopes	1,300	.2	Saugus sandy loam, 30 to 50 percent slopes, eroded	3,348	.6
Nacimiento silty clay loam, 9 to 15 percent slopes, eroded	437	.1	Sedimentary rock land	16,890	3.1
Nacimiento silty clay loam, 15 to 30 percent slopes, eroded	1,778	.3	Sespe clay loam, 15 to 30 percent slopes, eroded	1,747	.3
Nacimiento silty clay loam, 30 to 50 percent slopes	8,753	1.6	Sespe clay loam, 30 to 50 percent slopes	3,905	.7
Nacimiento silty clay loam, 50 to 75 percent slopes	6,123	1.1	Sespe clay loam, 50 to 75 percent slopes	6,305	1.1
Ojai very fine sandy loam, 0 to 2 percent slopes	246	(1/)	Soper loam, 15 to 30 percent slopes, eroded	2,540	.5
Ojai very fine sandy loam, 2 to 9 percent slopes, eroded	2,256	.4	Soper gravelly loam, 30 to 50 percent slopes, eroded	14,510	2.6
Ojai very fine sandy loam, 9 to 15 percent slopes, eroded	800	.1	Sorrento loam, 0 to 2 percent slopes	2,730	.5
Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded	2,984	.5	Sorrento loam, 2 to 9 percent slopes	7,293	1.3
Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded	1,010	.2	Sorrento silty clay loam, 0 to 2 percent slopes	3,238	.6
Pacheco silty clay loam	7,340	1.3	Sorrento silty clay loam, 2 to 9 percent slopes	5,714	1.0
Pico sandy loam, 0 to 2 percent slopes	7,362	1.3	Sorrento clay loam, heavy variant, 2 to 9 percent slopes	1,300	.2
Pico sandy loam, 2 to 9 percent slopes	2,260	.4	Sorrento clay loam, heavy variant, 9 to 15 percent slopes	963	.2
Pico loam, sandy substratum, 0 to 2 percent slopes	2,026	.4	Terrace escarpments	1,850	.3
Pits and dumps	1,210	.2	Tidal flats	1,790	.3
Rincon silty clay loam, 2 to 9 percent slopes	3,326	.6	Vina loam, 0 to 2 percent slopes	333	.1
			Vina loam, 2 to 9 percent slopes	1,732	.3

See footnote at end of table.

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Soil	Area	Extent	Soil	Area	Extent
	Acres	Percent		Acres	Percent
Vina gravelly loam, 2 to 9 percent slopes	826	0.2	Zamora loam, 9 to 15 percent slopes, eroded	1,402	0.3
Vina silty clay loam, 2 to 9 percent slopes	1,540	.3	Water	1,970	.4
Zamora loam, 2 to 9 percent slopes	1,687	.3	Total	548,874	100.0

1/ Less than 0.05 percent.

intermittently calcareous throughout.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate.

This soil is used primarily for citrus crops. A small acreage is in vegetables. The steeper slopes are used for field crops and for range. Urban use is increasing. Capability unit IIe-1.

Anacapa gravelly sandy loam, 2 to 9 percent slopes (AnC). This is a gently sloping to moderately sloping soil of the alluvial fans. In contrast with Anacapa sandy loam, 0 to 2 percent slopes (AcA), this soil is 15 to 25 percent gravel, 2 to 10 millimeters in size, and has steeper slopes.

Included with this soil in mapping were areas of Anacapa sandy loam, 0 to 2 percent slopes; Mocho gravelly loam; Sorrento loam; and a similar but unnamed soil that is 35 to 50 percent gravel.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is reduced by the gravel. From 5.5 to 6.5 inches of moisture is available in the 60 inches of effective rooting depth.

This soil is used mainly for field crops and for range. Some areas are idle, and some are used for urban development. Capability unit IIe-1.

Arnold Series

The Arnold series consists of somewhat excessively drained sandy soils 60 or more inches deep over soft sandstone. These soils formed in upland areas and have slopes of 9 to 50 percent. Elevations range from 200 to 1,500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 260 to 300 days. The average annual air temperature is 62° F. The vegetation is annual grasses and shrubs.

Arnold soils occur with Calleguas, Gaviota, San Andreas, and Saugus soils. They are used primarily for range and for watershed.

Arnold sand, 9 to 50 percent slopes (AsF).--This is a strongly sloping to steep soil of the uplands.

The surface layer is light brownish-gray, slightly acid sand about 24 inches thick. It is underlain by very pale brown, medium acid and strongly acid sand, fine sand, and soft sandstone. The sandstone is soft enough that it does not adversely affect root and water penetration.

Representative profile located about 2,250 feet west and 1,800 feet north of SE. corner of sec. 16, T. 3 N., R. 19 W., SBB&M.

A11--0 to 7 inches, light brownish-gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; weak, fine, granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; many very fine irregular pores; slightly acid (pH 6.5); clear, smooth boundary.

A12--7 to 17 inches, light brownish-gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; weak, fine, granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine irregular pores; slightly acid (pH 6.5); clear, wavy boundary.

A13 17 to 24 inches, light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; massive to single grain; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine irregular pores; slightly acid (pH 6.2); gradual, irregular boundary.

C1--24 to 43 inches, very pale brown (10YR 7/3) sand, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few medium, fine, and very fine roots; many very fine irregular pores; medium acid (pH 6.0); clear, irregular boundary.

C2--43 to 52 inches, very pale brown (10YR 7/3) fine sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few medium roots; many very fine irregular pores; medium acid (pH 5.8); clear, smooth boundary.

C3--52 to 65 inches, very pale brown (10YR 7/4) fine sand, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; very few medium roots; many very fine irregular pores; strongly acid (pH 5.5).

The A horizon ranges from light brownish gray through grayish brown, pale brown, and brown in hue of 10YR. This horizon is typically sand in texture but in places is loamy sand. It ranges from 16 to 30 inches in thickness. It is slightly acid to medium acid. The C horizon is white, light gray, light grayish brown, very pale brown, pale brown, or light yellowish brown in hue of 10YR. This horizon ranges from sand to loamy sand in texture and from 20 to 45 inches in thickness. In places there are large irregular blocks that resemble an iron-cemented hardpan. The sandstone is only slightly harder than the material in the A or C horizons.

Included with this soil in mapping were areas of Badland, Calleguas shaly loam, San Andreas sandy loam, Saugus sandy loam, and Soper loam; soils that have lost 6 to 10 inches of the surface layer through erosion; and soils, in Grimes Canyon, that have a gravelly or cobbly substratum.

Permeability is rapid. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 3.6 to 4.8 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used primarily for range and for watershed. Capability unit VIIs-4.

Azule Series

The Azule series consists of well-drained loams and gravelly loams abruptly underlain by sandy clay grading to sandy clay loam. These soils formed on terraces and old alluvial fans, in alluvium derived from sedimentary rocks. They have slopes of 0 to 15

percent. Elevations range from 500 to 1,500 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 60° F. The vegetation is annual grasses and scattered oaks.

Azule soils occur with Huerhuero and Rincon soils. They are used primarily for range and for field crops. A small acreage is used for citrus crops. Urban use is increasing.

Azule loam, 0 to 5 percent slopes (AuB).--This is a nearly level to gently sloping soil of the terraces and old alluvial fans.

The surface layer is grayish-brown, medium acid loam about 10 inches thick. The subsoil is brown, slightly acid sandy clay about 30 inches thick. There is an abrupt boundary between these two layers. Below the subsoil is brown, mildly alkaline sandy clay loam.

Representative profile located in Lindero Canyon, about 300 feet south and 600 feet east of NW. corner of sec. 8, T. 1 N., R. 18 W., SBB&M.

A--0 to 10 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and slightly plastic; many micro and common very fine roots; common micro tubular pores; medium acid (pH 6.0); abrupt, smooth boundary.

B2t--10 to 40 inches, brown (7.5YR 4/2) sandy clay, dark brown (7.5YR 3/2) moist; strong, medium, angular blocky structure; hard, firm, sticky and plastic; few micro roots; common micro tubular pores; common thin clay films on ped faces and in tubular pores; slightly acid (pH 6.5); clear, wavy boundary.

C--40 to 60 inches, brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, sticky and slightly plastic; very few micro roots; common micro tubular pores; mildly alkaline (pH 7.5).

The A horizon ranges from grayish brown through brown in hues of 10YR and 7.5YR. This horizon is typically loam in texture but in places is light clay loam. It ranges from 9 to 18 inches in thickness. It is slightly acid to medium acid. An abrupt AB boundary is typical, but the increase in clay is less than 15 percent. The B horizon ranges from brown through dark brown and dark reddish brown (7.5YR 5/4 or 4/2, 10YR 5/3, 5YR 3/4) in the upper part, to brown or dark brown, light yellowish brown, or dark yellowish brown (10YR 6/4 or 4/4 or 5/3, 7.5YR 5/4 or 4/4) in the lower part. Many somewhat darker colored clay films occur on ped faces and in pores. This horizon ranges from sandy clay through heavy clay loam or light clay in texture, is approximately 15 to 20 percent gravel 2 to 10 millimeters in size, and ranges from 21 to 30 inches in thickness. It ranges from slightly acid to mildly alkaline. The C horizon ranges from brown through light yellowish brown and yellowish brown (10YR 6/4 or 5/4, 7.5YR 5/4 or 4/4). It is sandy clay loam or light sandy clay in texture. In places it is 20 to 30 percent gravel or cobblestones. It ranges from slightly acid to moderately alkaline in reaction, and in places is calcareous below a depth of 40 inches.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam; Rincon silty clay loam; an unnamed soil that lacks the abrupt AB boundary and has lime within a depth of 40 inches; and a soil that has a loam-textured surface layer but is otherwise similar to Chesterton soils.

Permeability is slow. Surface runoff is slow to medium, and the erosion hazard is slight. The fine texture of the subsoil does not restrict extensive root development. The available water holding capacity is about 8.5 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for range and for field crops. A small acreage is used for citrus crops. Urban use is increasing. Capability unit IIe-3.

Azule loam, 2 to 9 percent slopes, eroded (AuC2).--This is a gently sloping to moderately sloping soil of the terraces and old alluvial fans. It differs from Azule loam, 0 to 5 percent slopes (AuB), in having steeper slopes, some degree of erosion, and a surface layer about 5 to 13 inches thick.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam; Rincon silty clay loam; Chesterton coarse sandy loam; an unnamed soil that lacks the abrupt AB boundary; and an unnamed soil that has lime within a depth of 40 inches.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used primarily for range and for field crops. A small acreage is used for citrus crops. Urban use is increasing. Capability unit IIIe-3.

Azule loam, 9 to 15 percent slopes (AuD).--This is a strongly sloping soil of the terraces. It differs from Azule loam, 0 to 5 percent slopes (AuB), mainly in having steeper slopes.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam; Rincon silty clay loam; Chesterton coarse sandy loam; an unnamed soil that lacks the abrupt AB boundary; and an unnamed soil that has lime within a depth of 40 inches.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used primarily for range. Small acreages are used for citrus crops and field crops and for urban development. Capability unit IVe-3.

Azule gravelly loam, 5 to 9 percent slopes (AzC).--This is a moderately sloping soil of the terraces and old alluvial fans. It has steeper slopes than Azule loam, 0 to 5 percent slopes (AuB), and it is 20 to 35 percent gravel, 2 to 10 millimeters in size, throughout the profile.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam; Rincon silty clay loam; Azule loam, 2 to 9 percent slopes, eroded; and a similar but unnamed soil that lacks the abrupt AB boundary.

Surface runoff is medium, and the erosion hazard is moderate. The available water holding capacity is reduced by the gravel. From 5.5 to 8.5 inches of moisture is available in the 60 inches of effective rooting depth.

This soil is used primarily for range and for field crops. Capability unit IIIe-3.

Badland

Badland (BdG) consists of very steep, severely eroded areas broken by numerous, deeply entrenched drainage channels. The soft, highly erosive sediments are capped with a thin mantle of relatively unstable soil material. This land type produces large amounts of silt and debris. It is nearly barren or has only sparse brush cover.

Included in mapping were areas of Gullied land; Sedimentary rock land; somewhat deeper soils on ridgetops, some of which are more gently sloping; and Arnold sand, which occurs in the Grimes Canyon area.

Surface runoff is very rapid, and the erosion hazard is very severe. The natural drainage, subsoil permeability, available water holding capacity, and effective rooting depth all vary. Inherent fertility is low.

This land type has no value for farming. It is used for watershed. Capability unit VIIIe-1.

Balcom Series

The Balcom series consists of well-drained, calcareous loams 22 to 40 inches deep over soft shale. These soils formed in upland areas and have slopes of 9 to 65 percent. Elevations range from 100 to 2,500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 280 to 300 days. The average annual air temperature is 62° F. The vegetation is dense brush or annual grasses and a few scattered oaks.

Balcom soils occur with Castaic, Nacimiento, and San Benito soils. They are mapped only in complex with Castaic soils. They are used for dryland grain and other field crops, for range, and for watershed.

The Balcom soils in this Area are mapped only with Castaic soils. A representative profile is described under the heading "Castaic-Balcom complex, 9 to 15 percent slopes, eroded."

Calleguas Series

The Calleguas series consists of well-drained shaly loams less than 20 inches deep to sandstone or shale. These soils formed in upland areas and have slopes of 9 to 50 percent. Elevations range from 100 to 2,200 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 60° F. The vegetation is brush and annual grasses and forbs.

Calleguas soils occur with Arnold, Castaic, Balcom, Santa Lucia, and Saugus soils. They are used primarily for range and for watershed. Urban use is increasing on the more gentle slopes.

Calleguas shaly loam, 30 to 50 percent slopes (CaF).- This is a steep soil of the uplands.

The surface layer is pale-brown, calcareous shaly loam about 9 inches thick. This layer is underlain by pale-brown, calcareous very shaly loam. At a depth of about 18 inches is hard, fractured, calcareous shale.

Representative profile located in Las Virgenes Canyon, about 800 feet north and 2,000 feet east of NW. corner of sec. 18, T. 1 N., R. 17 W., SBB&M.

A1--0 to 9 inches, pale-brown (10YR 6/3) shaly loam (40 percent shale), dark brown (10YR 4/2) moist; moderate, medium, granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many micro and very fine roots; many micro and very fine irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated; abrupt, smooth boundary.

C--9 to 18 inches, pale-brown (10YR 6/3) very shaly loam (55 percent shale), dark grayish brown (10YR 4/2) moist; moderate, medium, granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common micro and very fine roots; many micro and very fine irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated; gradual, irregular boundary.

R--18 to 24 inches, hard, fractured, calcareous shale.

The A horizon ranges from pale brown through grayish brown and light brownish gray in hues of 10YR and 2.5Y. This horizon ranges from loam to clay loam in texture, is 35 to 40 percent shale fragments, and ranges from 0 to 9 inches in thickness. Reaction is mildly to moderately alkaline. This horizon is calcareous. The C horizon is pale brown, grayish brown, light brownish gray, or light gray in hues of 10YR and 2.5Y. The texture of this horizon is very shaly or very gravelly loam or clay loam, 50 to 60 percent of which is rock fragments 2 millimeters to 6 or 8 inches long. This horizon ranges from 4 to 9 inches in thickness. The R horizon consists of tilted and bedded shale, sandstone, and mudstone and in most places is hard but fractured. Total depth of the soil to this horizon ranges from 4 to 18 inches.

Included with this soil in mapping were areas of Arnold sand; Gullied land; Linne silty clay loam; Sedimentary rock land; and Calleguas soils having slopes of 50 to 75 percent.

Permeability is moderate. Surface runoff is rapid, and the erosion hazard is severe. Roots do not penetrate to rock, though a few grow along fractures in the rock. The available water holding capacity is reduced by the coarse fragments. About 0.2 to 1.5 inches of moisture is available in the 4 to 18 inches of effective rooting depth. Inherent fertility is low.

This soil is used mainly for watershed, but there is limited grazing on the more gentle slopes. Capability unit VIIe-1.

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Calleguas shaly loam, 9 to 30 percent slopes, eroded (CaE2).--This is a strongly sloping to moderately steep soil of the uplands. It differs from Calleguas shaly loam, 30 to 50 percent slopes (CaF), mainly in having more gentle slopes that are in a few places marked by gullies. The average depth to rock is 12 inches, but the range is from 8 to 20 inches.

Included with this soil in mapping were areas of Arnold sand, of Calleguas shaly loam, 30 to 50 percent slopes, and of a similar but unnamed soil 20 to 36 inches deep.

Surface runoff is medium, and the erosion hazard is moderate. Available water holding capacity is reduced by the coarse fragments. From 0.6 to 1.7 inches of moisture is available in the 8 to 20 inches of effective rooting depth.

This soil is used mainly for range and for watershed. Capability unit VIIe-1.

Calleguas-Arnold complex, 30 to 50 percent slopes, eroded (CbF2).--About 50 percent of this mapping unit consists of Calleguas shaly loam, 35 percent of Arnold sand, and the rest of Castaic, Saugus, Diablo, Gaviota, and Soper soils. This mapping unit is in mountainous uplands, mainly at the Ventura-Los Angeles County line between Simi Peak and Calabasas Peak and in the Tripas Canyon area north of Santa Susana.

Sheet erosion is evident, but the Calleguas soil otherwise resembles Calleguas shaly loam, 30 to 50 percent slopes (CaF), and the Arnold soil resembles Arnold sand, 9 to 50 percent slopes (AsF). The Calleguas soil is about 18 inches deep to sandstone and shale, and the Arnold soil, 36 inches. Surface runoff is rapid for both, and the erosion hazard is severe. Permeability is moderate for the Calleguas soil but rapid for the Arnold. The Calleguas soil has an available water holding capacity of 0.6 to 1.5 inches in its 8 to 18 inches of rooting depth, as compared to 3.6 to 4.8 inches for the Arnold soil, which has a rooting depth of 60 inches. Inherent fertility is low for both soils.

This complex is used for watershed and for range. Capability unit VIIe-1 for Calleguas soil, and VIIs-4 for Arnold.

Camarillo Series

The Camarillo series consists of poorly drained sandy loams and loams 60 inches or more deep. These soils formed on alluvial fans and plains, in stratified alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 2 percent. Elevations range from 25 to 200 feet. The annual rainfall ranges from 14 to 16 inches, and the frost-free season from 300 to 350 days. The average annual air temperature is 59° F. The vegetation is salt-tolerant grasses and forbs.

Camarillo soils occur with Anacapa, Hueneme, Mocho, Pacheco, and Pico soils. They are used mainly for vegetables and lemons. Urban use is increasing.

Camarillo sandy loam (Cc).--This is a level to nearly level soil of the alluvial plains.

The surface layer is grayish-brown, calcareous sandy loam about 24 inches thick. It is underlain by grayish-brown and pale-brown, mottled, calcareous loam and fine sandy clay loam about 20 inches thick. At a depth of about 44 inches is light-gray, mottled, calcareous, stratified sandy loam and fine sand.

Representative profile located about 3/4 mile west of Wood Road on Etting Road, 0.28 mile south on farm road, and 100 feet east into field.

Ap--0 to 7 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; uppermost few inches loose, lower part strongly compacted by tillage; slightly hard, firm, slightly sticky and slightly plastic; very few very fine roots; many very fine irregular pores and very few very fine and fine tubular pores; mildly alkaline (pH 7.8) and very slightly effervescent; disseminated lime; clear, smooth boundary.

A12--7 to 17 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; hard, very friable, slightly sticky and slightly plastic; very few very fine roots; many very fine irregular pores and few very fine and fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; disseminated lime; gradual, wavy boundary.

AC--17 to 24 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; light yellowish brown (2.5Y 6/4 dry) and light olive brown (2.5Y 5/3 moist), coarse blotches of sandy material a few inches across; massive; hard, very friable, slightly sticky and slightly plastic; very few very fine roots and few coarse decayed roots; many very fine irregular pores and common very fine tubular pores; moderately alkaline (pH 8.0) and slightly effervescent; disseminated lime; clear, wavy boundary.

C1cs--24 to 36 inches, grayish-brown (2.5Y 5/2) heavy loam, dark grayish brown (2.5Y 4/3) moist; many, fine, distinct, light yellowish-brown (10YR 6/4) mottles; weak, coarse, prismatic structure; very hard, friable, sticky and plastic; no roots; many very fine irregular pores and many very fine and few fine and medium tubular pores; moderately alkaline (pH 8.0); disseminated lime; lower half of horizon has many fine soft gypsum masses; clear, wavy boundary.

C2cs--36 to 44 inches, pale-brown (10YR 6/3) fine sandy clay loam, light olive brown (2.5Y 5/3) moist; many, fine, distinct, brown (7.5YR 5/4 moist, 6/6 dry) mottles; massive; very hard, firm, sticky and plastic; common micro irregular pores and common very fine and few fine tubular pores; brown stains in

tubular pores; moderately alkaline (pH 8.2) and strongly effervescent; disseminated lime; many, fine, soft gypsum masses; discontinuous seams and lumps of reddish-brown (5YR 4/3 moist) silty clay loam; clear, smooth boundary.

C3--44 to 50 inches, light-gray (2.5Y 7/2) sandy loam, grayish brown (2.5Y 5/2) moist; many, medium, distinct, reddish-yellow (7.5YR 6/6 dry, 5/6 moist) mottles; many very soft nearly black 2- to 5-millimeter concretions and blotches; massive; very hard, friable, slightly sticky and slightly plastic; many, very fine, irregular pores and very few fine tubular pores; moderately alkaline (pH 8.2) and strongly effervescent; disseminated lime; clear, smooth boundary.

C4--50 to 60 inches, light-gray (2.5Y 7/2) heavy fine sand, light gray (2.5Y 6/1) moist; many, large, distinct, reddish-yellow (7.5YR 6/6 dry, 5/6 moist) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; many, very fine, irregular pores and very few, fine, tubular pores; brown stains in tubular pores; moderately alkaline (pH 8.4) but not effervescent; gradual, smooth boundary.

C5--60 to 80 inches, light-gray (5Y 7/2) fine sand, gray (5Y 5/1) moist; common, medium, distinct, brown (7.5YR 5/4 moist) and few, fine, prominent, dark reddish-brown (5YR 3/4 moist) mottles gradually decreasing to essentially none; massive; soft, very friable, nonsticky and nonplastic; many, very fine, irregular pores and very few fine tubular pores; strongly alkaline (pH 8.5) but not effervescent.

The A and AC horizons range from grayish brown through very dark grayish brown in hue of 10YR. Their total thickness ranges from 10 to 25 inches. The reaction is mildly to moderately alkaline. These horizons are very slightly to strongly calcareous. The C horizon ranges from light gray through gray and grayish brown, and from very pale brown through brown in hues of 10YR and 2.5Y, or from light olive gray through olive gray, and from pale yellow through olive, all in hue of 5Y. This horizon is stratified; it ranges from fine sand to fine sandy clay loam in texture, and if mixed, is about 18 to 35 percent clay. It is moderately to strongly alkaline, generally contains lime, and typically contains gypsum masses. Distinct to prominent mottles appear within a depth of 20 to 30 inches.

Included with this soil in mapping were areas of Camarillo loam, Hueneme sandy loam, Mocho loam, and Pacheco silty clay loam.

In areas not artificially drained the water table is within a depth of 2 feet. Periodically this soil contains soluble salts. Unless adequately protected, it is subject to infrequent flooding. Permeability is moderate. Surface runoff is very slow to ponded, and there is no erosion hazard. The available water holding capacity is about 7 to 8.5 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for vegetables, lemons, and other shallow-rooted crops. Urban use is increasing. Capability unit IIw-2.

Camarillo loam (Cd).--This is a level to nearly level soil of the alluvial plains. It differs from Camarillo sandy loam (Cc) mainly in texture of the surface layer and in having a fairly uniform loam texture throughout the profile.

Included with this soil in mapping were areas of Camarillo sandy loam; Camarillo loam, sandy substratum; Mocho loam; Pacheco silty clay loam; Hueneme sandy loam; and an unnamed soil that is clay loam in texture below a depth of 2 or 3 feet.

The water-holding capacity is about 8 to 10 inches in the 60 inches of effective rooting depth.

This soil is used for vegetables, lemons, and other shallow-rooted crops, and for urban development. Capability unit IIw-2.

Camarillo loam, sandy substratum (Ce). This is a level to nearly level soil of the alluvial plains. In contrast with Camarillo sandy loam (Cc), this soil is loam to a depth of about 40 to 48 inches and is underlain by sand.

Included with this soil in mapping were areas of Camarillo sandy loam, Camarillo loam, Hueneme sandy loam, Mocho loam, and Pacheco silty clay loam.

The available water holding capacity is about 7 to 7.5 inches in the 60 inches of effective rooting depth.

This soil is used for vegetables and lemons and for urban development. Capability unit IIw-2.

Castaic Series

The Castaic series consists of well-drained silty clay loams 22 to 40 inches deep over soft shale. These soils are noncalcareous in the surface layer and calcareous below a depth of 20 inches. They formed in upland areas and have slopes of 9 to 75 percent. Elevations range from 50 feet to 2,500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 280 to 300 days. The average annual air temperature is 62° F. The vegetation is dense brush or annual grasses and a few scattered shrubs.

Castaic soils occur with Balcom, Nacimiento, San Benito, and Saugus soils. They are mapped with Balcom soils and Saugus soils. They are used for citrus crops, dryland grain, and beans, for range, and for watershed.

Castaic-Balcom complex, 9 to 15 percent slopes, eroded (CfD2).--About 45 percent of this mapping unit consists of Castaic silty clay loam, 40 percent of Balcom loam, and the rest of Nacimiento, San Benito, Saugus, and Sorrento soils and Sedimentary rock land. The Castaic and Balcom soils are strongly sloping to rolling soils of the uplands.

The surface layer of the Castaic soil is grayish-brown, slightly acid and neutral silty clay loam about 26 inches thick. Below this is light brownish-gray, calcareous shale that crushes easily to silty clay loam.

Representative profile of a Castaic soil located 10,300 feet south and 300 feet west of SE. corner of sec. 13, T. 4 N., R. 18 W., SBB&M.

A11--0 to 5 inches, grayish-brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate, fine, subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common micro and very fine roots; common micro tubular pores and many very fine irregular pores; slightly acid (pH 6.5); clear, smooth boundary.

A12--5 to 26 inches, grayish-brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few micro, very fine, fine, and medium roots; common very fine and few fine tubular pores; neutral (pH 7.0); clear, smooth boundary.

C--26 to 60 inches, light brownish-gray (2.5Y 6/2) soft shale that crushes easily to silty clay loam, grayish brown (2.5Y 5/2) moist; exhibits weak rock structure; slightly hard, friable, slightly sticky and slightly plastic; very few micro, very fine, and fine roots; common micro and very fine tubular pores; moderately alkaline (pH 8.2) and strongly effervescent; lime disseminated and segregated in filaments.

The A horizon is light brownish gray, grayish brown, pale brown, or light yellowish brown in hues of 2.5Y and 10YR. This horizon ranges from silty clay loam to silt loam in texture, and from 22 to 40 inches in thickness. It is slightly acid to mildly alkaline and is calcareous below a depth of 20 inches. The soft calcareous shale of the C horizon can easily be cut with hand tools. It is light brownish gray, light yellowish brown, yellowish brown, or grayish brown in hues of 2.5Y or 10YR.

The surface layer of the Balcom soil is grayish-brown and light brownish-gray, calcareous loam about 23 inches thick. It is underlain by pale-olive, calcareous shale that crushes easily to loam.

Representative profile of a Balcom soil located 200 feet south and 50 feet west of NE. corner of sec. 30, T. 3 N., R. 20 W., SBB&M.

A11--0 to 8 inches, grayish-brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate, coarse, subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common micro roots; common micro and very fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; disseminated lime; clear, smooth boundary.

A12--8 to 23 inches, light brownish-gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak, coarse, subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common micro roots; few micro and very fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; disseminated lime and many fine segregated filaments of lime; clear, broken boundary.

C--23 to 60 inches, pale-olive (5Y 6/3) shale crushing easily to loam, olive (5Y 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; very few micro roots; few micro tubular pores; moderately alkaline (pH 8.0) and violently effervescent; disseminated lime and many fine segregated filaments of lime on most shale fragments.

The A horizon is light brownish gray, grayish brown, or pale brown in hues of 2.5Y and 10YR. It is heavy loam or light clay loam in texture and ranges from 22 to 40 inches in thickness. The C horizon is pale olive, light olive gray, light gray, or pale yellow in hue of 5Y, or light gray through light brownish gray in hue of 2.5Y. The soft, calcareous shale can easily be cut with hand tools. This soil is slightly to violently effervescent throughout the profile.

Sheet erosion is evident, but both the Castaic and the Balcom soil otherwise have the profile described as representative for the respective series. The surface layer is about 6 to 24 inches thick. The depth to shale is 22 to 40 inches. Permeability is moderate for the Balcom soil and moderately slow for the Castaic soil. Surface runoff is medium for both, and the erosion hazard is moderate. Both soils have an available water holding capacity of 3.5 to 7 inches in the 22 to 40 inches of rooting depth. Inherent fertility is medium for both soils.

This complex is used mainly for range and for watershed. A small acreage is in citrus crops and field crops. Use for homesites is increasing. Capability unit IIIe-1.

Castaic-Balcom complex, 15 to 30 percent slopes (CfE).--About 45 percent of this mapping unit consists of Castaic silty clay loam, 40 percent of Balcom loam, and the rest of Nacimiento, San Benito, and Saugus soils and Sedimentary rock land. The Castaic and Balcom soils are moderately steep to hilly soils of the uplands.

Each soil has the profile described as representative for the respective series. Sheet erosion is not apparent, and the surface layer is 12 to 24 inches thick. Permeability is moderate for the Balcom soil and moderately slow for the Castaic soil. Surface runoff is rapid for both, and the erosion hazard is severe. Both soils have an available water holding capacity of 3.5 to 7 inches in the 22 to 40 inches of rooting depth. Inherent fertility is medium for both soils.

These soils are used mainly for range and for watershed. Use for homesites is increasing. Capability unit IVe-1.

Castaic-Balcom complex, 30 to 50 percent slopes, eroded (CfF2).--About 45 percent of this mapping unit consists of Castaic silty clay loam, 40 percent of Balcom loam, and the rest of Nacimiento, San Benito, and Saugus soils, Badland, and Sedimentary rock land. The Castaic and Balcom soils are steep soils of the uplands.

Sheet erosion is evident, but each soil otherwise has the profile described as typical for the

respective series. The surface layer is about 6 to 24 inches thick. Both soils are about 22 to 40 inches to shale. Permeability is moderate for the Balcom soil, and moderately slow for the Castaic soil. Surface runoff is rapid for both, and the erosion hazard is severe. Both soils have an available water holding capacity of 3.5 to 7 inches in the 22 to 40 inches of rooting depth. Inherent fertility is medium for both soils.

This complex is used mainly for range and for watershed. Capability unit VIe-1.

Castaic-Balcom complex, 50 to 65 percent slopes, eroded (CfG2).--About 45 percent of this mapping unit consists of Castaic silty clay loam, 40 percent of Balcom loam, and the rest of Nacimiento, San Benito, and Saugus soils, Badland, and Sedimentary rock land. In the Balcom Canyon area, soils that are noncalcareous throughout but are similar in color and texture to Castaic soils are included. The Castaic and Balcom soils are very steep soils of the uplands.

Sheet erosion is evident, but each soil otherwise has the profile described as representative for the respective series. The surface layer of both soils is about 6 to 24 inches thick. Both soils are about 22 to 40 inches deep to shale. Permeability is moderate for the Balcom soil and moderately slow for the Castaic soil. Surface runoff is very rapid for both, and the erosion hazard is very severe. Both soils have an available water holding capacity of 3.5 to 7 inches in the 22 to 40 inches of rooting depth. Inherent fertility is medium for both soils.

This complex is used mainly for watershed and for range. Capability unit VIIe-1.

Castaic and Saugus soils, 30 to 75 percent slopes, eroded (CgG2).--About 40 percent of this mapping unit consists of Castaic silty clay loam, 40 percent of Saugus sandy loam, and the rest of Balcom soils and Sedimentary rock land. The Castaic and Saugus soils are steep to very steep soils of the uplands.

Sheet erosion and a few gullies are evident, but the Castaic soil otherwise has the profile described as representative for the series, and the Saugus soil resembles Saugus sandy loam, 30 to 50 percent slopes, eroded (ShF2). Permeability is moderately slow for the Castaic soil and moderate for the Saugus soil. Surface runoff is very rapid for both, and the erosion hazard is very severe. The Castaic soil has an available water holding capacity of 3.5 to 7 inches in the 22 to 40 inches of rooting depth, as compared with 3.5 to 5 inches for the Saugus soil, which has a rooting depth of 36 to 48 inches. Inherent fertility is medium for both soils.

This mapping unit is used primarily for range and for watershed. Capability unit VIIe-1.

Chesterton Series

The Chesterton series consists of moderately well drained sandy loams that are abruptly underlain by a sandy clay subsoil and are 8 to 32 inches deep over a silica-cemented hardpan. These soils formed on old terraces, in alluvium derived from different kinds of rocks. They have slopes of 5 to 30 percent. Elevations range from 100 to 1,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season is 300 to 330 days. The average annual air temperature is 62° F. The vegetation is annual grasses and scattered brush.

Chesterton soils occur with Azule, Huerhuero, and Rincon soils. They are used for field crops, for lemons, for range, for watershed, and for urban development.

Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded (ChD2).--This is a moderately sloping to strongly sloping soil of the terraces.

The surface layer is grayish-brown, slightly acid coarse sandy loam and sandy loam about 10 inches thick. The subsoil is brown, slightly acid sandy clay 16 inches thick. There is an abrupt boundary between these two layers. Below the subsoil is a light yellowish-brown, slightly acid, silica-cemented hardpan (see pl. I).

Representative profile located 1,200 feet north and 1,500 feet east of SW. corner of sec. 33, T. 3 N., R. 19 W., SBB&M.

Ap--0 to 5 inches, grayish-brown (10YR 5/2) coarse sandy loam (5 to 10 percent gravel 2 to 5 millimeters in size), very dark grayish brown (10YR 3/2) moist; moderate, fine, granular structure; slightly hard, very friable, nonsticky and nonplastic; common micro roots; many micro irregular pores; slightly acid (pH 6.2); abrupt, smooth boundary.

A12--5 to 10 inches, grayish-brown (2.5Y 5/2) sandy loam (5 to 10 percent gravel 2 to 5 millimeters in size), very dark grayish brown (10YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; few micro roots; many micro tubular pores; slightly acid (pH 6.2); abrupt, wavy boundary.

B2t--10 to 26 inches, brown (7.5YR 5/4) sandy clay, dark brown (7.5YR 4/2) moist; strong, coarse, columnar structure; extremely hard, firm, sticky and very plastic; very few micro, very fine, and fine roots, mainly along ped faces; common micro tubular pores; many moderately thick clay films on ped faces and in tubular pores; slightly acid (pH 6.2); abrupt, broken boundary.

C1msi--26 to 36 inches, light yellowish-brown (10YR 6/4), silica-cemented duripan, dark yellowish brown (10YR 3/4) moist; massive; extremely hard; few moderately thick clay films and stains in cracks; slightly acid (pH 6.2); abrupt, broken boundary.

C2--36 to 60 inches, light yellowish-brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, firm, slightly sticky and slightly plastic; common micro tubular pores; mildly alkaline (pH 7.5).

The A horizon ranges from grayish brown to dark grayish brown in hues of 10YR and 2.5Y. It ranges from 8 to 14 inches in thickness. It is slightly

acid to medium acid. A thin, light-gray A2 horizon, 1/4 to 1 inch thick, typically occurs at the boundary between the A and B horizons, and slight dusting down the B2t structural faces is evident. The AB boundary is abrupt. The B horizon is brown or yellowish brown in hues of 7.5YR and 10YR. It is sandy clay or light clay in texture, ranges from 8 to 18 inches in thickness, and has strong or medium coarse columnar to moderate angular blocky structure. This horizon is slightly acid to medium acid. The C1msi horizon is a silica-cemented duripan that ranges from 10 to 44 inches in thickness, is extremely hard, and has opal coatings on 50 percent or more of its surface. The C2 horizon ranges from light yellowish brown to gray in hue of 10YR. It ranges from sandy clay loam through sandy loam in texture. It is not cemented. In some seams it is calcareous. The Chesterton soils in this Area are somewhat grayer than those typical of the series. Also, they lack concretions and are dominated by montmorillonite rather than kaolinite clay minerals.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam and of unnamed soils that lack the clay subsoil, or the duripan, or both.

Permeability is very slow. Surface runoff is medium, and the erosion hazard is moderate. The fine texture of the subsoil does not favor the development of an extensive root system, and roots do not penetrate the duripan. The available water holding capacity is about 2 to 3.5 inches in the 16 to 32 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for field crops, for lemons, for urban development, and for range. Capability unit IVe-3.

Chesterton sandy loam, 9 to 30 percent slopes, severely eroded (CkE3).--This is a strongly sloping to moderately steep soil of the terraces. It differs from Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded (ChD2), mainly in having steeper slopes and less coarse sand in the surface layer. In many areas erosion has been severe enough to expose the subsoil. The depth to the hardpan ranges from 8 to 16 inches.

Included with this soil in mapping were areas of Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded; Huerhuero very fine sandy loam; and unnamed soils that lack the clay subsoil, or the hardpan, or both.

Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 1 inch to 2 inches in the 8 to 16 inches of effective rooting depth.

This soil is used primarily for range and for watershed. Capability unit VIe-3.

Cibo Series

The Cibo series consists of well-drained clays 24 to 54 inches deep over basic igneous rock. These soils formed in upland areas and have slopes of 5 to 30 percent. Elevations range from 50 to 2,200 feet. The annual rainfall ranges from 14 to 24 inches, and the frost-free season from 250 to 330 days. The average annual air temperature is 62° F. The vegetation is annual grasses and scattered brush.

Cibo soils occur with Gilroy, Hambright, and Vina soils. Cibo soils are used primarily for range and for field crops. Small acreages are used for lemons and for urban development. The steeper slopes are used for watershed.

Cibo clay, 15 to 30 percent slopes (CmE).--This is a moderately steep to hilly soil of the uplands.

The soil is brown, neutral clay to a depth of about 24 inches. Below this is hard, fractured, basic igneous rock.

Representative profile located 2.8 miles east and 0.7 mile south of summit of Round Mountain, near Camarillo State Hospital.

A11--0 to 3 inches, brown (7.5YR 5/2) clay, dark brown (7.5YR 4/2) moist; strong, fine and medium, angular blocky structure; very hard, firm, sticky and plastic; many micro and very fine roots; many very fine irregular pores and common micro tubular pores; neutral (pH 7.0); clear, smooth boundary.

A12--3 to 17 inches, brown (7.5YR 5/2) clay, dark brown (7.5YR 4/2) moist; moderate, coarse, subangular blocky structure; very hard, firm, sticky and plastic; few micro roots; common micro tubular pores; common slickensides; neutral (pH 7.0); gradual, wavy boundary.

C--17 to 24 inches, brown (7.5YR 5/2) clay, dark brown (7.5YR 4/2) moist; small, decomposed fragments of reddish-yellow (7.5YR 6/6) rock; moderate, coarse, subangular blocky structure; very hard, firm, sticky and plastic; few micro roots; common micro tubular pores; common slickensides; neutral (pH 6.5); gradual, irregular boundary.

R--24 inches, reddish-yellow (7.5YR 6/6) basic igneous rock, brown (7.5YR 4/4) moist.

The A horizon is brown, dark brown, dark grayish brown, or very dark grayish brown in hues of 10YR and 7.5YR. This horizon is typically clay but in places is heavy clay loam. It ranges from 17 to 24 inches in thickness. It is slightly acid to neutral. The C horizon is dark brown and brown in hues of 10YR and 7.5YR. It ranges from clay to heavy clay loam in texture and from 7 to 16 inches in thickness. It is neutral to moderately alkaline and is noncalcareous. This horizon contains fragments of the hard but fractured basalt, which occurs at a depth of 24 to 40 inches. In places there are seams of lime in the fractures.

Included with this soil in mapping were areas of Cibo clay, 5 to 15 percent slopes; Gilroy clay loam; and Hambright rocky clay loam.

Permeability is slow. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 4 to 6.5 inches in the 24 to 40 inches of rooting depth. Inherent fertility is high.

This soil is used primarily for range and for watershed. Small acreages are used for lemons and for urban development. Capability unit IVe-5.

Cibo clay, 5 to 15 percent slopes (CmD).--This is a moderately sloping and strongly sloping soil of the uplands. It has more gentle slopes than Cibo clay, 15 to 30 percent slopes (CmE). The average depth to rock is 34 to 54 inches.

Included with this soil in mapping were areas of Cibo clay, 15 to 30 percent slopes; and Gilroy clay loam.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is about 5 to 9 inches in the 34 to 54 inches of effective rooting depth.

This soil is used for field crops, for lemons, for range, for watershed, and for urban development. Capability unit IIIe-5.

Coastal Beaches

Coastal beaches (CnB) consists of narrow, sandy beaches and adjacent sand dunes, some of which are partly covered by waves during high tide and exposed during low tide. A few beaches are cobbly. In some areas there are no beaches because bluffs rise abruptly from the water's edge. This land type is essentially barren. In some areas the sand dunes have been stabilized with native plants and introduced beach grasses.

Included with this land type in mapping are small areas of Riverwash and Tidal flats.

Drainage is excessive to very poor. Permeability is very rapid. Surface runoff is slow, but the erosion hazard is very severe because of wind and wave action. The available water holding capacity is 2 to 3 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This land type has no value for farming. It is used for urban development and for recreation. Capability unit VIIIw-4.

Corralitos Series

The Corralitos series consists of excessively drained loamy sands and sands 60 inches or more deep. These soils formed on alluvial plains and alluvial fans, in stratified alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 1,000 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from 280 to 330 days. The average annual air temperature is 60° F. The vegetation is annual grasses and scattered brush.

Corralitos soils occur with Cortina, Metz, and Pico soils and Sandy alluvial land. They are used for citrus crops, avocados, strawberries, vegetables, field crops, and walnuts, and for urban development.

Corralitos loamy sand, 0 to 2 percent slopes (CoA).--This is a level to nearly level soil of the alluvial fans and alluvial plains.

The surface layer is grayish-brown, slightly acid loamy sand and loamy coarse sand about 18 inches thick. It is underlain by light-gray and light brownish-gray loamy coarse sand, gravelly coarse sand, and fine sand. This material extends to a depth of more than 60 inches.

Representative profile located about 200 feet west and 175 feet south of N1/4 corner of sec. 3, T. 2 N., R. 19 W., SBB&M.

A11--0 to 3 inches, grayish-brown (10YR 5/2) loamy sand, dark grayish brown (10YR 4/2) moist; weak, fine, angular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots and few coarse roots; many very fine irregular pores; slightly acid (pH 6.5); abrupt, smooth boundary.

A12--3 to 18 inches, grayish-brown (10YR 5/2) loamy coarse sand, dark grayish brown (10YR 4/2) moist; weak, medium, angular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; many very fine irregular pores; slightly acid (pH 6.5); gradual, wavy boundary.

C1--18 to 30 inches, light brownish-gray (10YR 6/2) loamy coarse sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots and few fine roots; many very fine irregular pores; some well-rounded cobblestones in the lower part; neutral (pH 7.0), but some lime in soil adjacent to limestone rocks; clear, smooth boundary.

C2--30 to 45 inches, light-gray (10YR 7/2) gravelly coarse sand, light brownish gray (10YR 6/2) moist; single grain; loose, nonsticky and nonplastic; very few very fine roots; many very fine irregular pores; common cobblestones and stones; neutral (pH 6.8); clear, smooth boundary.

C3--45 to 57 inches, light brownish-gray (10YR 6/2) fine sand, dark grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; very few fine roots; many very fine irregular pores; neutral (pH 6.8).

The A horizon is light brownish gray or grayish brown in hue of 10YR. This horizon is typically loamy sand in texture but in places is sand. It ranges from 6 to 18 inches in thickness. The C horizon is light brownish gray or light gray in hue of 10YR. It is loamy coarse sand, gravelly coarse sand, or fine sand in texture. In places this horizon is stratified below a depth of 40 inches with material that is stony, or very gravelly, or both.

Included with this soil in mapping were small areas of Corralitos loamy sand, 2 to 9 percent slopes; Metz loamy sand; Metz loamy fine sand; Pico sandy loam, sandy substratum; and Sandy alluvial land.

Permeability is very rapid. Surface runoff is very slow, and there is no erosion hazard. The available water holding capacity is about 3.7 to 4.5 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used for citrus crops, avocados, strawberries, vegetables, field crops, and walnuts, and for urban development. Capability unit IIIs-4.

Corralitos loamy sand, 2 to 9 percent slopes (CoC).--This is a gently sloping to moderately slop-

ing soil of the alluvial fans. It differs from Corralitos loamy sand, 0 to 2 percent slopes (CoA), mainly in having steeper slopes.

Included with this soil in mapping were areas of Corralitos loamy sand, 0 to 2 percent; Metz loamy fine sand; and Pico sandy loam.

Surface runoff is slow, and the erosion hazard is slight.

This soil is used mainly for citrus crops, avocados, field crops, and walnuts, and for urban development. The more gentle slopes are used for strawberries and vegetables. Capability unit IIIs-4.

Cortina Series

The Cortina series consists of somewhat excessively drained stony and very stony sandy loams 60 inches or more deep. These soils formed on alluvial fans and valley floors, in alluvium derived predominantly from sedimentary rocks. They have slopes of 2 to 15 percent. Elevations range from 25 to 1,200 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 62° F. The vegetation is oaks, grasses, and brush.

Cortina soils occur with Corralitos, Garretson, and Metz soils and Sandy alluvial land. They are used for citrus crops and avocados, for urban development, and for range.

Cortina stony sandy loam, 2 to 9 percent slopes (CrC).--This is a gently sloping to moderately sloping soil of the alluvial fans and valley floors.

The surface layer is grayish-brown and brown, slightly acid and neutral stony sandy loam about 36 inches thick. It is underlain by very pale brown, neutral very stony and cobbly sand. This material extends to a depth of 60 inches or more.

Representative profile located about 400 feet east and 20 feet south of intersection of Burnham Road and California Highway 150.

A11--0 to 8 inches, grayish-brown (10YR 5/2) stony sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine irregular pores and common very fine tubular pores; slightly acid (pH 6.5); abrupt, smooth boundary.

A12--8 to 36 inches, brown (10YR 5/3) stony sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few fine and very fine roots; many very fine irregular pores and common very fine tubular pores; neutral (pH 6.7); gradual, irregular boundary.

C--36 to 60 inches, very pale brown (10YR 7/3) very stony and cobbly sand, pale brown (10YR 6/3) moist; single grain; loose, nonsticky and nonplastic; neutral (pH 7.0).

The A horizon is grayish brown or brown in hue of 10YR. This horizon is generally stony sandy loam in texture but in places is gravelly or cobbly sandy loam or loam. It ranges from 18 to 36 inches in thickness. The C horizon is very pale brown, pale brown, or light yellowish brown in hues of 10YR and 2.5Y. This horizon is neutral to mildly alkaline, highly stratified very stony, very gravelly, or very cobbly sand or loamy sand. The content of gravel, cobblestones, and stones is 35 to 50 percent.

Included with this soil in mapping were small areas of Corralitos loamy sand, Sandy alluvial land, Metz loamy sand, and Pico sandy loam; dark grayish-brown stony and gravelly heavy sandy loams on alluvial fans between Fillmore and Timber Canyons; and a soil, in Lion Canyon south of Ojai, that is similar to the Cortina soil but is calcareous throughout.

Permeability is rapid. Surface runoff is slow, and the erosion hazard is slight. The available water holding capacity is reduced by the number of coarse fragments. About 2 to 3.5 inches of moisture is available in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used for citrus crops and avocados, for urban development, and for range. Capability unit IVs-7.

Cortina very stony sandy loam, 9 to 15 percent slopes (CsD).--This is a strongly sloping soil of the alluvial fans. It has steeper slopes than Cortina stony sandy loam, 2 to 9 percent slopes (CrC), and is typically 50 to 75 percent cobblestones and stones. This soil occurs mainly in the Timber Canyon area.

Included with this soil in mapping were areas of Cortina stony sandy loam, 2 to 9 percent slopes; Riverwash; Garretson gravelly loam; soils that are similar to the Cortina soils but have a dark grayish-brown surface layer; and soils that contain no stones or cobblestones but are more than 50 percent gravel.

Surface runoff is medium, and the erosion hazard is moderate. The available water holding capacity is reduced by the coarse fragments. About 1 inch to 2 inches of moisture is available in the 60 inches of effective rooting depth.

This soil is used for range, for watershed, and for citrus crops and avocados. Capability unit VIs-7.

Cropley Series

The Cropley series consists of well-drained clays 60 or more inches deep. These soils formed on alluvial fans and plains, in alluvium derived from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 800 feet. The annual rainfall ranges from 14 to 16 inches, and the frost-free season from 300 to 330 days. The average annual air temperature is 61° F. The vegetation is annual grasses and forbs.

Cropley soils occur with Cropley clay, calcareous variant, and with Rincon and Salinas soils. They are used for citrus crops, vegetables, and field crops, and for urban purposes.

Cropley clay, 0 to 2 percent slopes (CyA).--This is a nearly level soil of the alluvial plains.

The surface layer is very dark gray, neutral and mildly alkaline clay about 22 inches thick. It is underlain by stratified, very dark grayish-brown and grayish-brown, strongly calcareous clay, silty clay loam, and silt loam. This material extends to a depth of more than 60 inches.

Representative profile located 4,400 feet south and 150 feet west of intersection of La Loma Avenue and Los Angeles Avenue.

A11--0 to 2 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; moderate, medium, granular structure; extremely hard, very firm, very sticky and very plastic; many very fine and fine roots; few very fine, few fine, and very few medium tubular pores; neutral (pH 7.0); abrupt, smooth boundary.

A12--2 to 14 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; weak, coarse, prismatic and moderate, medium, angular blocky structure; extremely hard, very firm, very sticky and very plastic; common fine, common very fine, and few medium roots; few very fine, few fine, and very few medium tubular pores; numerous slickensides; neutral (pH 7.0); gradual, irregular boundary.

A13--14 to 22 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; moderate, coarse, angular blocky structure; extremely hard, very firm, very sticky and very plastic; common very fine, fine, medium, and coarse roots; numerous slickensides; mildly alkaline (pH 7.5); clear, wavy boundary.

AC--22 to 28 inches, very dark grayish-brown (10YR 3/2) clay, very dark brown (10YR 2/2) moist; moderate, medium, angular blocky structure; extremely hard, very firm, very sticky and plastic; few micro and very fine roots; very few very fine and fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime segregated in filaments; gradual, wavy boundary.

C1ca 28 to 40 inches, grayish-brown (2.5Y 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; massive; very hard, very firm, sticky and very plastic; very few very fine and fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime segregated in filaments; gradual, wavy boundary.

C2ca--40 to 60 inches, grayish-brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; many very fine irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated into filaments.

The A horizon is dark gray or very dark gray in hues of 10YR or 2.5Y. This horizon ranges from clay to silty clay in texture and from 20 to 40 inches in thickness. It is noncalcareous. Typically, when dry and not cultivated, the uppermost few inches of the surface layer has granular structure. The AC and C horizons are grayish brown to very dark grayish brown, brown, and dark brown in hues of 2.5Y or 10YR. They range from clay to sandy clay loam, silty clay loam, and silt loam in texture. A little gravel occurs throughout the profile in places. The gravel content in the lower part of the C horizon ranges from 5 to 25 percent. Both the AC and the C horizons are mildly to moderately alkaline and are calcareous.

Included with this soil in mapping were areas of Cropley clay, calcareous variant; Rincon and Salinas soils; and an unnamed, very dark grayish-brown sandy clay, in the Thousand Oaks-Newbury Park area and the Santa Rosa Valley, that formed in alluvium derived from basic igneous rocks.

Permeability is slow. Surface runoff is slow, and there is no erosion hazard. The available water holding capacity is about 8 to 10 inches in the 60 inches of rooting depth. Inherent fertility is high.

This soil is used primarily for citrus crops, vegetables, and field crops. Capability unit IIs-5.

Cropley clay, 2 to 9 percent slopes (CyC).--This is a gently sloping to moderately sloping soil of the alluvial fans and plains. It differs from Cropley clay, 0 to 2 percent slopes (CyA), mainly in having steeper slopes.

Included with this soil in mapping were areas of Rincon and Salinas soils; and an unnamed, very dark grayish-brown sandy clay, in the Thousand Oaks-Newbury Park area and the Santa Rosa Valley, that formed in alluvium derived from basic igneous rocks.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate.

This soil is used primarily for citrus crops, vegetables, and field crops, and for urban development. Capability unit IIe-5.

Cropley Series, Calcareous Variant

The Cropley series, calcareous variant, consists of somewhat poorly drained clays 60 or more inches deep. These soils formed on alluvial plains in alluvium derived from sedimentary rocks. They have slopes of 0 to 2 percent. Elevations range from 25 to 500 feet. The annual rainfall ranges from 14 to 16 inches, and the frost-free season from 300 to 330 days. The average annual air temperature is 61° F. The vegetation is salt-tolerant grasses, shrubs, and forbs.

The Cropley soil, calcareous variant, occurs with Camarillo, Cropley, Pacheco, and Salinas soils. It is used for lemons, vegetables, and field crops, and for urban development.

Cropley clay, calcareous variant (Cz).--This is a nearly level soil of the alluvial plains.

The surface layer is dark-gray, calcareous clay about 21 inches thick. It is underlain by gray, strongly calcareous heavy clay loam about 19 inches thick. Below this is light brownish-gray, strongly calcareous silty clay that contains soft masses of gypsum and becomes mottled with increasing depth.

Representative profile located 300 feet NE. of intersection of Las Posas Road and Laguna Road.

Ap--0 to 6 inches, dark-gray (10YR 4/1) clay, black (10YR 2/1) when moist; strong, fine and medium, subangular blocky structure; hard, friable, very sticky and very plastic; few micro roots; few micro tubular pores; moderately alkaline

(pH 8.2) and slightly effervescent; abrupt, smooth boundary.

A1--6 to 21 inches, dark-gray (10YR 4/1) clay, black (10YR 2/1) when moist; moderate, fine and medium, subangular blocky structure; hard, friable, very sticky and very plastic; few micro roots; common micro tubular pores and very fine irregular pores; common slickensides; moderately alkaline (pH 8.2) and slightly effervescent; gradual, smooth boundary.

C1--21 to 40 inches, gray (5Y 5/1) heavy clay loam, very dark grayish brown (2.5Y 3/2) when moist; massive; hard, friable, sticky and plastic; very few micro roots; common micro and very fine tubular pores; common slickensides; moderately alkaline (pH 8.2) and strongly effervescent; clear, wavy boundary.

C2--40 to 60 inches, light brownish-gray (2.5Y 6/2) silty clay; dark grayish brown (2.5Y 4/2) when moist; massive; hard, firm, sticky and plastic; common micro and very fine tubular pores; common slickensides; moderately alkaline (pH 8.2) and strongly effervescent; common soft gypsum masses increase with increasing depth.

The A horizon is dark gray or very dark gray in hues of 2.5Y or 10YR. This horizon is clay, sandy clay, or silty clay in texture and ranges from 12 to 36 inches in thickness. It is typically calcareous, but in places the uppermost few inches of the surface layer is noncalcareous. The C horizon ranges from grayish brown or yellowish brown in hue of 10YR through light brownish gray, grayish brown, and olive brown in hue of 2.5Y to gray or olive gray in hue of 5Y. In places this horizon is stratified but is predominantly fine textured; it is typically heavy clay loam, clay loam, silty clay, sandy clay, or clay. It is calcareous and contains soft masses and nodules of gypsum.

Included with this soil in mapping were areas of Camarillo, Cropley, Pacheco, and Salinas soils.

The depth to the water table ranges from 3 to more than 5 feet, depending on the season, the irrigation practices, and the drainage system. Rust-colored mottles are common below a depth of 60 inches and in places occur higher in the profile. Permeability is slow. Surface runoff is very slow, and there is no erosion hazard. The available water holding capacity is about 8 to 10 inches in the 60 inches of rooting depth. Inherent fertility is high.

This soil is used primarily for lemons, vegetables, and field crops, and for urban development. Capability unit IIw-5.

Diablo Series

The Diablo series consists of well-drained clays 40 to 50 inches deep over soft, fractured, calcareous shale. These soils formed in upland areas and have slopes of 9 to 50 percent. Elevations range from 100 to 2,200 feet. The annual rainfall ranges from 15 to 22 inches, and the frost-free season from 270 to 350 days. The average annual air temperature is 60° F. The vegetation is annual grasses and a few scattered oaks.

Diablo soils occur with San Benito, Nacimiento, and Gazos soils. They are used primarily for range and for watershed. Some dryland grain is grown, and small areas are used for urban development.

Diablo clay, 15 to 30 percent slopes (DbE).--This is a moderately steep to hilly soil of the uplands.

The surface layer is dark-gray and gray clay about 28 inches deep. This layer is neutral at or near the surface and becomes moderately alkaline and calcareous with increasing depth. It is underlain by grayish-brown, calcareous clay loam about 12 inches thick. At a depth of about 40 inches is soft, fractured shale.

Representative profile located SW. of Foster Park, 1,100 feet west and 1,000 feet north of SW. corner of sec. 15, T. 3 N., R. 23 W., SBB&M.

A1--0 to 15 inches, dark-gray (5Y 4/1) clay, black (5Y 2/1) moist; strong, very coarse, prismatic structure; extremely hard, firm, sticky and plastic; many micro, many very fine, very few fine, and very few medium roots; few micro and very fine tubular pores; common slickensides; neutral (pH 7.0); clear, smooth boundary.

ACca--15 to 28 inches, gray (5Y 5/1) clay, dark gray (5Y 4/1) moist; strong, very coarse, prismatic structure; extremely hard, firm, sticky and plastic; many micro, many very fine, very few fine, and very few medium roots; few micro and very fine tubular pores; common slickensides; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated in filaments and soft masses; gradual, wavy boundary.

C1ca--28 to 40 inches, grayish-brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; weak, very coarse, prismatic structure; very hard, friable, sticky and plastic; common micro, common very fine, very few fine, and very few medium roots; common micro and very fine tubular pores; common slickensides; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and segregated in filaments and soft masses; diffuse, wavy boundary.

C2--40 to 52 inches, light brownish-gray (2.5Y 6/2), soft, fractured shale and mudstone, grayish brown (2.5Y 5/2) moist; crushes easily to clay loam.

The A and AC horizons are gray, dark gray, and very dark gray in hues of 10YR, 2.5Y, and 5Y. They are typically clay in texture but in places are silty clay. They range from 24 to 30 inches in thickness. The upper part of the A horizon ranges from slightly acid to mildly alkaline and is noncalcareous. In places the lower part of the A horizon and the AC horizon are moderately alkaline and are calcareous. In places the uppermost 1/2 to 1 inch has granular structure. If the material is thoroughly dry, cracks 1/2 inch wide extend from the surface to a depth of 20 inches. The C horizon ranges from light brownish gray through dark grayish brown or pale brown through brown in hues of 10YR and 2.5Y. This horizon is clay

or clay loam in texture and ranges from 16 to 20 inches in thickness. The depth to shale ranges from 40 to 50 inches. The shale ranges from unconsolidated sediments to fractured or firm.

Included with this soil in mapping were areas of Diablo clay, 9 to 15 percent slopes; Diablo clay, 30 to 50 percent slopes; San Benito clay loam; Nacimiento silty clay loam; Gazos silty clay loam; and an unnamed clay, in the Thousand Oaks area, that is calcareous throughout but is otherwise similar to the Diablo soil. About 30 percent of this mapping unit has been eroded. In the eroded areas the depth to rock is 24 to 36 inches.

Permeability is slow. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 6 to 8.5 inches in the 40 to 50 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for range and for watershed. Some dryland grain is grown. Capability unit IVe-5.

Diablo clay, 9 to 15 percent slopes (DbD).--This is a rolling and strongly sloping soil of the uplands. It differs from Diablo clay, 15 to 30 percent slopes (DbE), mainly in having more gentle slopes.

Included with this soil in mapping were areas of Diablo clay, 15 to 30 percent slopes; San Benito clay loam; Nacimiento silty clay loam; Gazos silty clay loam; and an unnamed clay, in the Thousand Oaks area, that is similar to the Diablo soil but is calcareous throughout. About 30 percent of this mapping unit has been eroded. In the eroded areas the depth to rock is 24 to 36 inches.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used mainly for range, for watershed, and for dryland grain. Urban use is increasing on the milder slopes. Capability unit IIIe-5.

Diablo clay, 30 to 50 percent slopes (DbF).--This is a steep soil of the uplands. It differs from Diablo clay, 15 to 30 percent slopes (DbE), mainly in having steeper slopes.

Included with this soil in mapping were areas of Diablo clay, 15 to 30 percent slopes; San Benito clay loam; Nacimiento silty clay loam; and Gazos silty clay loam. About 30 percent of this mapping unit has been eroded. In the eroded areas the depth to rock is about 24 inches.

Surface runoff is rapid, and the erosion hazard is severe.

This soil is used mainly for range and for watershed. Capability unit VIe-5.

Fill Land

Fill land (Fd) consists of areas of mechanically mixed soil material in which horizons are no longer discernible, and of areas artificially filled with sandy material either dredged from the ocean or taken from local streams. Fill areas contain varying numbers of rocks and amounts of concrete, asphalt, and other debris. In places soils of recognized series are buried under as much as 5 feet of sandy material. Thickness of the fill material and variations in the underlying soils make quality estimates difficult. Fill land is almost exclusively restricted to local military reservations.

Included with this land type in mapping were areas of Camarillo and Hueneme soils.

Fill land is typically poorly drained and has a seasonal water table at a depth of 3 feet. Drainage channels have lowered the water table locally. Permeability, surface runoff, erosion hazard, available water holding capacity, effective rooting depth, and inherent fertility all vary.

This land type is used primarily for urban development. Capability unit IVw-4.

Garretson Series

The Garretson series consists of well-drained loams and gravelly loams 60 inches or more deep. These soils formed on alluvial fans and plains, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 1,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 280 to 350 days. The average annual air temperature is 62° F. The vegetation is annual grasses, forbs, and scattered oaks.

Garretson soils occur with Mocho, Sorrento, and Cortina soils. They are used for vegetables, field crops, citrus crops, avocados, and walnuts, for urban development, and for range.

Garretson loam, 2 to 9 percent slopes (GaC).--This is a gently sloping to moderately sloping soil of the alluvial fans.

The surface layer is grayish-brown and yellowish-brown, slightly acid loam about 35 inches thick. It is underlain by yellowish brown and pale-brown, mildly alkaline loam and gravelly fine sandy loam. This material extends to a depth of more than 60 inches.

Representative profile located about 1,400 feet west and 5,800 feet south of NE. corner of sec. 26, T. 3 N., R. 20 W., SBB&M.

Ap1--0 to 3 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak, medium, subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; very few roots; many very fine tubular pores; slightly acid (pH 6.5); abrupt, smooth boundary.

Ap2--3 to 12 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; very hard, friable, slightly sticky and slightly plastic; common fine roots; common fine tubular pores; slightly acid (pH 6.3); clear, smooth boundary.

A1--12 to 23 inches, grayish-brown (10YR 5/2) heavy loam, very dark grayish brown (10YR 3/2) moist; weak, medium, subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine roots; common very fine tubular pores; slightly acid (pH 6.5); gradual, smooth boundary.

AC--23 to 35 inches, yellowish-brown (10YR 5/4) heavy loam, dark brown (10YR 3/3) moist; weak, medium, subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; few coarse and common fine tubular pores; slightly acid (pH 6.5); diffuse, smooth lower boundary.

C1--35 to 56 inches, yellowish-brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine and few medium tubular pores; mildly alkaline (pH 7.4); clear, smooth lower boundary.

C2--56 to 61 inches, pale-brown (10YR 6/3) gravelly fine sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, nonsticky and nonplastic; many very fine irregular pores; mildly alkaline (pH 7.8).

The A and AC horizons are grayish brown, dark grayish brown, dark brown, and yellowish brown in hues of 10YR and 2.5Y. They are typically loam in texture but in places are light clay loam. They range from 20 to 36 inches in thickness. They are slightly acid to neutral. The C horizon ranges from pale brown through dark brown or light yellowish brown through dark yellowish brown in hue of 10YR or light olive brown in hue of 2.5Y. The upper part of this horizon is generally loam or light clay in texture. In places it is gravelly below a depth of 40 inches. In a few places the lower part contains lime.

Included with this soil in mapping were small areas of Garretson loam, 0 to 2 percent slopes; Garretson gravelly loam; Garretson silt loam, calcareous variant; Mocho loam; and Sorrento loam.

Permeability is moderate. Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is about 8 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for citrus crops, avocados, vegetables, and walnuts, for urban development, and for range. The milder slopes are used for vegetables and field crops. Capability unit IIe-1.

Garretson loam, 0 to 2 percent slopes (GaA).--This is a nearly level soil of the alluvial plains or fans. It differs from Garretson loam, 2 to 9 percent slopes (GaC), mainly in having more gentle slopes.

Included with this soil in mapping were areas of Mocho loam; Sorrento loam; Garretson loam, 2 to 9 percent slopes; Garretson gravelly loam, 2 to 9 percent slopes; and Garretson silt loam, calcareous variant.

Surface runoff is very slow, and there is no erosion hazard.

This soil is used mainly for vegetables, field crops, citrus crops, avocados, and walnuts, for urban development, and for range. Capability unit I-1.

Garretson gravelly loam, 2 to 9 percent slopes (GbC).--This is a gently sloping to moderately sloping soil of the alluvial fans. In contrast with Garretson loam, 2 to 9 percent slopes (GaC), this soil is 15 to 35 percent gravel, 2 to 15 millimeters in size, throughout the profile.

Included with this soil in mapping were areas of Mocho gravelly loam, Cortina stony sandy loam, Sorrento loam, and Garretson loam.

The available water holding capacity is 6 to 7.5 inches in the 60 inches of effective depth.

This soil is used mainly for citrus crops, avocados, field crops, and vegetables, and for urban development. Capability unit IIe-1.

Garretson Series, Calcareous Variant

The Garretson series, calcareous variant, consists of well-drained silt loams 60 inches or more deep. These soils formed on alluvial fans and plains, in alluvium derived from sedimentary rocks. They have slopes of 2 to 5 percent. Elevations range from 25 to 1,800 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 300 to 330 days. The average annual air temperature is 62° F. The vegetation is annual grasses and scattered shrubs and oaks.

The Garretson soil, calcareous variant, occurs with Mocho and Sorrento soils. It is used for field crops, for lemons and vegetables, and for range.

Garretson silt loam, calcareous variant, 2 to 5 percent slopes (GcB).--This is a gently sloping to moderately sloping soil of the alluvial fans and plains.

The surface layer is gray, highly calcareous silt loam about 18 inches thick. It is underlain by light-gray, highly calcareous silt loam that extends to a depth of more than 60 inches.

Representative profile located 1,500 feet west and 2,300 feet north of SE. corner of sec. 15, T. 3 N., R. 18 W., SBB&M.

A11--0 to 2 inches, gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; weak, fine, platy structure; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; common very fine and few fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated; clear, smooth boundary.

A12--2 to 14 inches, gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; massive; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; common very fine and fine tubular pores and common very fine irregular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated; gradual, wavy boundary.

A13--14 to 18 inches, gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; massive; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; common very fine tubular and irregular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated; gradual, clear boundary.

C1--18 to 26 inches, light-gray (10YR 7/1) silt loam, dark gray (10YR 4/1) moist; massive; slightly

hard, friable, nonsticky and slightly plastic; few very fine roots; common very fine tubular and irregular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated; gradual, wavy boundary.

C2--26 to 42 inches, light-gray (10YR 7/1) silt loam, dark gray (10YR 4/1) moist; massive; slightly hard, friable, nonsticky and slightly plastic; very few very fine roots; very few fine tubular pores and common very fine irregular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated and segregated in soft masses; gradual, irregular boundary.

C3--42 to 60 inches, light-gray (10YR 7/1) silt loam, dark gray (10YR 4/1) moist; massive; slightly hard, friable, nonsticky and slightly plastic; very few very fine tubular pores and common very fine irregular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated and segregated in soft masses.

The A horizon is gray or light gray in hue of 10YR. It ranges from silt loam and heavy loam through light clay loam and silty clay loam in texture and from 10 to 19 inches in thickness. The C horizon is light gray in hue of 10YR and in chromas of less than 2. It is typically silt loam in texture but in places is stratified with very fine sandy loam or loam. The soil is strongly to violently effervescent throughout.

Included with this soil in mapping were small areas of Garretson, Mocho, and Sorrento soils; scattered areas in which the soils are 25 percent shale fragments; and some soils that have slopes of 5 to 9 percent.

Permeability is moderate. Surface runoff is slow to medium, and the erosion hazard is slight. The available water holding capacity is about 10 to 12 inches in the 60 inches of rooting depth. Inherent fertility is medium.

This soil is used primarily for field crops, for lemons, and for range. It is not well suited to calcium-sensitive crops. Some vegetables are grown. Capability unit IIe-1.

Gaviota Series

The Gaviota series consists of well-drained sandy loams 8 to 20 inches deep over sandstone. These soils formed in upland areas and have slopes of 15 to 50 percent. Elevations range from 100 to 2,500 feet. The annual rainfall ranges from 15 to 20 inches, and the frost-free season from 250 to 270 days. The average annual air temperature is 60° F. The vegetation is annual grasses, brush, and scattered oaks.

Gaviota soils occur with Arnold, Calleguas, San Andreas, and Saugus soils. They are used primarily for range and for watershed.

Gaviota rocky sandy loam, 15 to 50 percent slopes (GrF).--This is a hilly to steep soil of the uplands. Rock outcrops cover 5 to 10 percent of the surface.

The surface layer is yellowish-brown, neutral sandy loam about 8 inches thick. It is underlain by sandstone.

Representative profile located about 3,900 feet east and 200 feet south of SE. corner of sec. 9, T. 2 N., R. 19 W., SBB&M.

A--0 to 8 inches, yellowish-brown (10YR 5/4) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common micro and few very fine roots; many micro and common very fine tubular pores; neutral (pH 7.0); abrupt, smooth boundary.

R--8 inches, sandstone rock.

The A horizon ranges from grayish brown through yellowish brown or dark grayish brown through dark yellowish brown in hue of 10YR. It is typically sandy loam in texture, but in places it is loam and is less than 18 percent clay. This horizon ranges from 8 to 14 inches in thickness. It is slightly acid to neutral. In places there is an AC or a C horizon. The C horizon ranges from light brownish gray through light yellowish brown or very pale brown in hue of 10YR. This horizon is sandy loam in texture and ranges from 0 to 6 inches in thickness. It is neutral to slightly acid.

Included with this soil in mapping were areas of Badland, Sedimentary rock land, Calleguas shaly loam, Arnold sand, San Andreas sandy loam, and Saugus sandy loam.

Permeability is moderately rapid. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 0.5 to 1 inch in the 8 to 14 inches of effective rooting depth. Inherent fertility is low.

This soil is used primarily for range and for watershed. Capability unit VIIe-8.

Gazos Series

The Gazos series consists of well-drained silty clay loams 24 to 46 inches deep over fractured shale. These soils formed in upland areas and have slopes of 15 to 75 percent. Elevations range from 100 to 2,500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 62° F. The vegetation is brush and annual grasses and scattered oaks.

Gazos soils occur with Diablo, Linne, Los Osos, Millsholm, and Santa Lucia soils. They are used primarily for watershed and for range. Some areas are used for urban development.

Gazos silty clay loam, 50 to 75 percent slopes (GsG).--This is a very steep soil of the uplands.

The surface layer is grayish-brown, neutral silty clay loam about 15 inches thick. It is underlain by light brownish-gray and pale-brown, slightly acid and medium acid very shaly silty clay loam about 31 inches thick. At a depth of about 46 inches is well-fractured shale.

Representative profile located about 1,400 feet north and 1,100 feet west of SE. corner of sec. 14, T. 4 N., R. 22 W., SBB&M.

A1--0 to 15 inches, grayish-brown (10YR 5/2) silty clay loam, very dark gray (10YR 3/1) moist; strong, medium, subangular blocky structure; hard, friable, sticky and plastic; many micro and few very fine and fine roots; many micro, common very fine, and few fine tubular pores; neutral (pH 7.0); gradual, wavy boundary.

A&C--15 to 28 inches, light brownish-gray (10YR 6/2) shaly silty clay loam (approximately 35 percent shale fragments), dark grayish brown (10YR 4/2) moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; common micro, common very fine and fine, and few medium roots; few, fine, common micro, and common, very fine, tubular roots; slightly acid (pH 6.5); gradual, irregular boundary.

C&R--28 to 46 inches, pale-brown (10YR 6/3) very shaly silty clay loam (approximately 50 percent shale fragments), brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; common fine and few micro, very fine and medium roots; few, fine, common micro, and common, very fine, tubular pores; medium acid (pH 6.0); gradual, irregular boundary.

R--46 inches, well-fractured shale.

The A horizon ranges from grayish brown and dark grayish brown in hues of 10YR and 2.5Y through dark gray in hue of 10YR. This horizon is silty clay loam or clay loam in texture and is less than 35 percent clay. It ranges from 10 to 20 inches in thickness. It is neutral to slightly acid. Some profiles lack the A&C horizon, but most profiles have a C&R horizon that is 35 to 50 percent shale fragments. The A&C and C&R horizons are light brownish gray, grayish brown, pale brown, or brown in hue of 10YR. They are similar to the A horizon in texture and are neutral to medium acid. The C&R horizon ranges from 14 to 26 inches in thickness. Firm shale is at a depth of 24 to 46 inches. The Gazos soils in this Area have a thinner A horizon and have more gravel in the A&C and C&R horizons than the Gazos soils mapped elsewhere in California.

Included with this soil in mapping were areas of Linne silty clay loam, eroded; Millsholm very rocky loam; Santa Lucia shaly silty clay loam; and an unnamed soil, on Oak Ridge, between the towns of Simi and Piru, that has a subsoil of grayish-brown light clay and is about 30 inches thick over hard, fractured, noncalcareous shale.

Permeability is moderately slow. Surface runoff is very rapid, and the erosion hazard is very severe. The available water holding capacity is reduced by the shale fragments in the profile. About 3 to 5.5 inches of moisture is available in the 24 to 46 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for watershed. It has some value for range. Capability unit VIIe-1.

Gazos silty clay loam, 15 to 30 percent slopes (GsE).--This is a moderately steep soil of the uplands. In contrast with Gazos silty clay loam, 50 to 75 percent slopes (GsG), it has more gentle slopes and is 30 to 46 inches deep over bedrock.

Included with this soil in mapping were areas of Diablo clay; Linne silty clay loam; San Benito clay loam; Santa Lucia shaly silty clay loam; soils that have slopes of 9 percent and have lost between 25 and 75 percent of the original surface layer through erosion; and an unnamed soil, on Oak Ridge, between the towns of Simi and Piru, that has a subsoil of grayish-brown light clay and is about 30 inches deep over hard, fractured, noncalcareous shale.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is 4 to 5.5 inches.

This soil is used mainly for range and for watershed. Urban use is increasing. Capability unit IVe-1.

Gazos silty clay loam, 30 to 50 percent slopes (GsF).--This is a steep soil of the uplands. It differs from Gazos silty clay loam, 50 to 75 percent slopes (GsG), mainly in having more gentle slopes.

Included with this soil in mapping were areas of Linne silty clay loam; Millsholm loam; San Benito clay loam; and an unnamed soil, on Oak Ridge, between the towns of Simi and Piru, that has a subsoil of grayish-brown light clay and is about 30 inches deep over hard, fractured, noncalcareous shale.

Surface runoff is rapid, and the erosion hazard is severe.

This soil is used mainly for range and for watershed. Capability unit VIe-1.

Gilroy Series

The Gilroy series consists of well-drained clay loams 21 to 40 inches deep over hard basic igneous rock. These soils developed in upland areas and have slopes of 9 to 50 percent. Elevations range from 100 to 2,500 feet. The annual rainfall ranges from 16 to 22 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 61° F. The vegetation is brush and scattered oaks and an understory of annual grasses.

Gilroy soils occur with Cibo, Hambright, and Millsholm soils, and Igneous rock land. They are used primarily for range and watershed. The more gentle slopes are used for lemons, for field crops, and for urban development.

Gilroy very rocky clay loam, 15 to 50 percent slopes (GvF).--This is a moderately steep to steep soil of the uplands. Rock outcrops cover 10 to 25 percent of the area.

The surface layer is dark grayish-brown, medium acid clay loam about 10 inches thick. The subsoil is brown, medium acid clay loam about 11 inches thick. It is underlain by hard, fractured basic igneous rock.

Representative profile located in the vicinity of Lake Eleanor, 550 feet west and 50 feet south of NE. corner of sec. 34, T. 1 N., R. 19 W., SBB&M.

A1--0 to 10 inches, dark grayish-brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; moderate, medium, granular structure; slightly hard, friable, slightly sticky and plastic; common micro, common very fine, and few fine roots; many micro and few fine tubular pores; medium acid (pH 6.0); clear, wavy boundary.

B2t--10 to 21 inches, brown (7.5YR 4/2) clay loam, dark brown (7.5YR 3/2) moist; weak, fine, angular blocky structure; hard, firm, sticky and plastic; few micro, very fine, and medium roots; common micro, common very fine, and very few fine tubular pores; common moderately thick clay films on ped faces and in tubular pores; medium acid (pH 6.0); gradual, wavy boundary.

R--21 to 26 inches, well-fractured basic igneous rock; weathered in uppermost few inches; roots and clay films along fractures.

The A horizon is brown, dark brown, or dark grayish brown in hues of 10YR and 7.5YR. This horizon is typically light clay loam in texture but in places is loam. It has granular or blocky structure. It ranges from neutral to medium acid. It ranges from 10 to 16 inches in thickness. The boundary between the A and B horizons is clear to gradual. The B horizon is brown, light brownish gray, or pinkish gray in hues of 7.5YR or 10YR. This horizon is less than 35 percent clay. It ranges from 11 to 18 inches in thickness. It is neutral to medium acid. The clay films on ped faces and in tubular pores range from thin to moderately thick. In places there is a thin, lighter colored C horizon. Hard but fractured igneous rock is typically at a depth of 21 to 34 inches.

Included with this soil in mapping were areas of Cibo clay, Hambright very rocky loam, Igneous rock land, Millsholm very rocky loam, and Gilroy clay loam.

Permeability is moderately slow. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 2.5 to 4.5 inches in the 21 to 34 inches of rooting depth. Inherent fertility is medium.

This soil is used primarily for range and for watershed. Small areas are used for urban development. Capability unit VIs-1.

Gilroy clay loam, 9 to 15 percent slopes (GtD).--This is a strongly sloping soil of the uplands. In contrast with Gilroy very rocky clay loam, 15 to 50 percent slopes (GvF), it has more gentle slopes, does not have rock outcrops, and is 26 to 40 inches deep over rock.

Included with this soil in mapping were areas of Cibo clay; Hambright very rocky loam; Millsholm loam; and Gilroy clay loam, 15 to 30 percent slopes.

Surface runoff is medium, and the erosion hazard is moderate. The available water holding capacity is about 4.5 to 6.5 inches in the 26 to 40 inches of effective rooting depth.

This soil is used primarily for range and for watershed, and to a lesser extent for citrus crops and field crops, and for urban development. Capability unit IVe-1.

Gilroy clay loam, 15 to 30 percent slopes (GtE).--This is a moderately steep soil of the uplands. In contrast with Gilroy very rocky clay loam, 15 to 50 percent slopes (GvF), it does not have rock outcrops, and it is 24 to 36 inches deep over rock.

Included with this soil in mapping were areas of Cibo clay; Hambright very rocky loam; Millsholm loam; Gilroy clay loam, 9 to 15 percent slopes; and Gilroy very rocky clay loam, 15 to 50 percent slopes.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is 4 to 6 inches in the 24 to 36 inches of effective rooting depth.

This soil is used primarily for range and for watershed. Small acreages are used for lemons and for urban development. Capability unit IVe-1.

Gullied Land

Gullied land (GxG) consists of deep gullies and steep to very steep escarpments. Typically, it has a thin mantle of relatively unstable soil material and produces a large amount of silt and debris. The gullies are typically associated with soft sediments, basic igneous rock. Gullied areas too small to delineate are shown by a special symbol on the soil map. Gullied land is typically nearly barren or has only sparse brush cover.

Included with this land type in mapping were areas of Badland and of Balcom, Gaviota, and Saugus soils.

Surface runoff is very rapid, and the erosion hazard is very severe. The natural drainage, subsoil permeability, available water holding capacity, and effective rooting depth all vary. Inherent fertility is low.

This land type has no value for farming. It is used for watershed. Capability unit VIIIe-1.

Hambright Series

The Hambright series consists of well-drained heavy loams that have a clay loam subsoil and are 6 to 19 inches deep over basic igneous rock. These soils developed in steep mountainous areas and have slopes of 15 to 75 percent. Elevations range from 100 to 2,500 feet. The annual rainfall ranges from 15 to 22 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 62° F. The vegetation is brush and annual grasses and forbs.

Hambright soils occur with Cibo, Gilroy, and Millsholm soils and Igneous rock land. They are used primarily for watershed and for range. Scattered areas are used for urban development.

Hambright very rocky loam, 15 to 75 percent slopes (HaG).--This is a moderately steep to very steep soil of the mountainous uplands. Rock outcrops cover 10 to 25 percent of the area.

The surface layer is brown, medium acid heavy loam about 2 inches thick. The subsoil is brown, medium acid and neutral clay loam and stony clay loam about 12 inches thick. Hard volcanic rock occurs at a depth of about 14 inches.

Representative profile located 5,800 feet north and 5,700 feet east of where Highway 101 crosses Conejo Creek.

A1--0 to 2 inches, brown (10YR 4/3) heavy loam, dark brown (10YR 3/2) moist; moderate, medium, granular structure; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine irregular pores and many very fine and fine tubular pores; medium acid (pH 5.8); abrupt, smooth boundary.

B21--2 to 8 inches (10YR 4/3) clay loam, very dark brown (10YR 2/3) moist; moderate, medium, subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; continuous thin clay films on ped faces and in pores; medium acid (pH 6.0); gradual, smooth boundary.

B22--8 to 14 inches, brown (10YR 4/3) very stony clay loam, very dark brown (10YR 2/3) moist; 40 percent stones and cobblestones; massive; or moderate, medium, granular structure; slightly hard, firm, slightly sticky and slightly plastic; very few medium roots; common fine and very fine tubular pores; slightly acid (pH 6.5); abrupt, wavy boundary.

R--14 inches, volcanic breccia and hard basalt.

The A horizon ranges from grayish brown through dark grayish brown or brown and dark brown in hues of 10YR and 7.5YR. This horizon is typically loam in texture but in places is clay loam. It ranges from 0 to 6 inches in thickness. It is slightly acid to medium acid. The B horizon ranges from grayish brown through very dark grayish brown or brown and dark brown in hues of 10YR and 7.5YR, or from reddish gray through dark reddish brown or reddish brown in hue of 5YR. This horizon ranges from 6 to 13 inches in thickness. It is neutral to medium acid. The B22 horizon is 35 to 50 percent cobblestones and stones. The depth to basic igneous rock is 6 to 19 inches.

Included with this soil is mapping were areas of Cibo clay, Gilroy very rocky clay loam, Igneous rock land, and Hambright rocky clay loam.

Permeability is moderate. Surface runoff is rapid to very rapid, and the erosion hazard is severe to very severe. The available water holding capacity is 0.5 to 1.5 inches in the 6 to 19 inches of effective rooting depth. Inherent fertility is low.

This soil is used primarily for watershed, but there is scattered urban development on the more gentle slopes. Capability unit VIIs-8.

Hambright rocky clay loam, 30 to 50 percent slopes (HbF).--This is a steep soil of the mountainous uplands. In contrast with Hambright very rocky loam, 15 to 75 percent slopes (HaG), it has more gentle slopes and a surface layer of clay loam. Rock outcrops cover 2 to 10 percent of the area.

Included with this soil in mapping were areas of Cibo clay; Gilroy very rocky clay loam; Hambright very rocky loam, 15 to 75 percent slopes; and Igneous rock land.

The available water holding capacity is 1 inch to 2 inches in the 6 to 19 inches of effective rooting depth.

This soil is used primarily for range and for watershed. A limited acreage is used for urban development. Capability unit VIIe-8.

Hueneme Series

The Hueneme series consists of poorly drained loamy sands and sandy loams 60 inches or more deep. These soils formed in basins and on alluvial plains, in highly stratified alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 2 percent. Elevations range from 25 to 250 feet. The annual rainfall ranges from 14 to 16 inches, and the frost-free season from 300 to 350 days. The average annual air temperature is 60° F. The vegetation is salt-tolerant grasses and shrubs.

Hueneme soils occur with Anacapa, Camarillo, Mocho, Pacheco, and Pico soils. They are used for vegetables, lemons, and strawberries, for field crops, and for urban development.

Hueneme sandy loam (Hn).--This is a nearly level soil of the alluvial plains and basins.

The surface layer is grayish-brown, calcareous loamy fine sand and light sandy loam about 17 inches thick. Below this are layers of mottled grayish-brown and light-gray, calcareous sandy loam, loamy sand, and sand. At a depth of about 65 inches is mottled light brownish-gray, stratified, calcareous silt and sand.

Representative profile located about 1,000 feet east and 1,300 feet south of intersection of Nauman Road and Hueneme Road.

Ap1--0 to 2 inches, grayish-brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak, fine, granular structure; slightly hard, friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores and very few fine tubular pores; moderately alkaline (pH 8.0); abrupt, smooth boundary.

Ap2--2 to 9 inches, grayish-brown (10YR 5/2) light sandy loam, very dark grayish brown (10YR 3/2) moist; massive (compacted by tillage); hard, friable, nonsticky and nonplastic; few fine and very fine roots; many very fine irregular pores; moderately alkaline (pH 8.0) and effervescent; lime disseminated; clear, smooth boundary.

A1--9 to 17 inches, grayish-brown (2.5Y 5/2) light sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and very fine roots; many very fine irregular pores; and few fine tubular pores; moderately alkaline (pH 8.2) and strongly effervescent; lime disseminated; gradual, smooth boundary.

C1--17 to 23 inches, grayish-brown (2.5Y 5/2) light sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, nonsticky and slightly plastic; few fine and very fine roots; many very fine irregular pores and common very fine and few fine tubular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated and segregated into soft masses; many gypsum segregations; gradual, wavy boundary.

C2--23 to 37 inches, grayish-brown (2.5Y 5/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; common, fine, distinct mottles of light gray (2.5Y 7/2) dry and pale yellow (2.5Y 7/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine irregular pores and common very fine and fine tubular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated and segregated into soft masses; very few gypsum segregations; abrupt, smooth boundary.

C3--37 to 41 inches, light-gray (2.5Y 7/2) sandy loam, grayish brown (2.5Y 5/2) moist; many, fine, faint mottles of light gray (2.5Y 7/2) dry and pale yellow (2.5Y 7/3) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine irregular pores and common fine and very fine tubular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated and segregated into soft masses; many gypsum segregations; clear, smooth boundary.

C4--41 to 65 inches, light-gray (2.5Y 7/2) sand, grayish brown (2.5Y 5/2) moist; many, fine, faint mottles of light gray (2.5Y 7/2) dry and pale yellow (2.5Y 7/3) moist; single grain; loose, nonsticky and nonplastic; many very fine irregular pores; moderately alkaline (pH 8.2) and strongly effervescent; lime disseminated; clear, smooth boundary.

C5g--65 inches, light brownish-gray (2.5Y 6/2), stratified silt and sand, dark grayish brown (2.5Y 4/2) moist; many, large, distinct mottles of reddish yellow (7.5YR 6/6) dry and strong brown (7.5YR 4/6) moist; weak, fine, platy structure (layered); soft, friable, slightly sticky and slightly plastic; many very fine irregular pores and few micro tubular pores; moderately alkaline (pH 8.4) and strongly effervescent; lime disseminated and segregated into soft masses.

The A horizon ranges from light brownish gray through dark grayish brown in hues of 10YR and 2.5Y. This horizon ranges from light sandy loam to loamy sand in texture and from 11 to 17 inches in thickness. It is mildly alkaline to moderately alkaline and calcareous; in places the uppermost few inches of the surface layer is noncalcareous. The C horizon ranges from light gray through grayish brown and light brownish gray in hue of 2.5Y. This horizon is mildly alkaline to moderately alkaline and calcareous. It contains gypsum masses and faint to distinct mottles.

Included with this soil in mapping were areas of Hueneme loamy sand, loamy substratum; Camarillo sandy loam; Anacapa sandy loam; Metz loamy sand; and Pico sandy loam.

Tile drains lower the water table to a depth of 60 inches or more, but occasionally the water table rises and is 2 to 3 feet below the surface. Periodically this soil contains soluble salts. Unless adequately protected, it is subject to infrequent flooding. Permeability is moderately rapid. Surface runoff is very slow, and there is no erosion hazard. The available water holding capacity is about 5 to 6.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for vegetables, lemons, and strawberries, for field crops, and for urban development. Capability unit IIw-2.

Hueneme loamy sand, loamy substratum (Hm).--This is a nearly level soil of the alluvial plains and basins. It differs from Hueneme sandy loam (Hn) mainly in having a surface layer of loamy sand and in being underlain by stratified sandy loam, loam, silt loam, and silt below a depth of 40 inches.

Included with this soil in mapping were areas of Hueneme sandy loam, Camarillo sandy loam, Anacapa sandy loam, Metz loamy sand, and Pico sandy loam.

Permeability is moderate. The available water holding capacity is 5.5 to 7 inches in the 60 inches of effective rooting depth.

This soil is used for vegetables, lemons, and strawberries, for field crops, and for urban development. Capability unit IIw-2.

Huerhuero Series

The Huerhuero series consists of moderately well drained very fine sandy loams that have a sandy clay subsoil. These soils formed on alluvial fans and terraces, in alluvium derived from sedimentary rocks. They have slopes of 0 to 30 percent. Elevations range from 100 to 1,200 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from 300 to 325 days. The average annual air temperature is 60° F. The vegetation is annual grasses and scattered brush.

Huerhuero soils occur mainly with Azule, Rincon, and San Benito soils. They are used for citrus crops and field crops, for urban development, and for range.

Huerhuero very fine sandy loam, 0 to 5 percent slopes (HuB).--This is a nearly level to gently sloping soil of the alluvial fans and terraces.

The surface layer is grayish-brown and dark grayish-brown, slightly acid very fine sandy loam about 21 inches thick. A layer of gray, medium acid very

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fine sandy loam approximately 4 inches thick separates the surface layer from the subsoil. The subsoil is brown and pale-brown, neutral and moderately alkaline sandy clay and sandy clay loam about 23 inches thick. The lower part is strongly calcareous. At a depth of about 48 inches is brown, moderately alkaline, calcareous very fine sandy loam.

Representative profile located about 1,500 feet north and 200 feet west of the intersection of Bradley Road and Los Angeles Avenue (Calif. Highway 118).

Ap--0 to 13 inches, grayish-brown (10YR 5/3) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; very hard, friable, slightly sticky and slightly plastic; very few medium, few fine, and common very fine roots; many very fine and few fine tubular pores; slightly acid (pH 6.1); clear, wavy boundary.

A1--13 to 21 inches, dark grayish-brown (10YR 4/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; common very fine and many micro tubular pores; slightly acid (pH 6.5); clear, wavy boundary.

A2--21 to 25 inches, gray (10YR 5/1-6/1) very fine sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; few very fine and common micro tubular pores; medium acid (pH 6.0); abrupt, smooth boundary.

B21t--25 to 31 inches, brown (10YR 5/3) sandy clay, dark brown (10YR 4/3) moist; strong, medium, angular blocky structure; extremely hard, very firm, very sticky and very plastic; few very fine roots in cracks; common very fine and few micro discontinuous tubular pores; continuous thin clay films on ped faces; neutral (pH 6.8); clear, wavy boundary.

B22t--31 to 39 inches, brown (10YR 5/3) sandy clay, dark brown (10YR 4/3) moist; strong, coarse, angular blocky structure; extremely hard, firm, very sticky and plastic; very few fine roots in pores; many thick very dark gray (10YR 3/1) dry clay films on ped faces and in pores; moderately alkaline (pH 8.0) and very slightly effervescent; lime disseminated; dark-colored splotches on some ped faces; clear, wavy boundary.

B3tca--39 to 48 inches, pale-brown (10YR 6/3) sandy clay loam, yellowish brown (10YR 5/4) moist; weak, fine, angular blocky structure; very hard, firm, sticky and plastic; very few very fine roots; very few very fine and micro tubular pores; continuous thin clay films on ped faces and continuous moderately thick clay films in pores; moderately alkaline (pH 8.0) and strongly calcareous; lime segregated in soft masses; clear, wavy boundary.

C--48 to 57 inches, brown (10YR 5/3) very fine sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, slightly sticky and slightly plastic; moderately alkaline (pH 8.0) and very slightly effervescent; lime disseminated.

The Ap and A1 horizons range from grayish brown through dark grayish brown and brown in hue of 10YR. These horizons are typically very fine sandy loam in texture but in places are loam. Both range from slightly acid to neutral. The A2 horizon ranges from 1/4 inch to 8 inches in thickness. The combined thickness of the A horizons ranges from 18 to 30 inches. The B horizon ranges from pale brown and light brown through brown or light yellowish brown to dark yellowish brown in hues of 10YR and 7.5YR. This horizon ranges from sandy clay to clay in texture and from 20 to 30 inches in thickness. The C horizon ranges from pale brown through brown and light yellowish brown to yellowish brown in hue of 10YR. This horizon ranges from loamy sand to very fine sandy loam in texture. It becomes less calcareous with increasing depth.

Included with this soil in mapping were areas of Azule loam; Rincon silty clay loam; and Huerhuero very fine sandy loam, 5 to 9 percent slopes.

Permeability is very slow. Surface runoff is slow, and the erosion hazard is slight. The fine texture of the subsoil does not favor the development of extensive root systems. The available water holding capacity is about 2.5 to 5 inches in the 18 to 30 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for citrus crops and field crops, for urban development, and for range. Capability unit IIIe-3.

Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded (HuC2).--This is a moderately sloping soil of the terraces and alluvial fans. In contrast with Huerhuero very fine sandy loam, 0 to 5 percent slopes (HuB), it has steeper slopes, is eroded, contains small gullies, and has a surface layer 12 to 24 inches thick.

Included with this soil in mapping were areas of Azule loam; Rincon silty clay loam; Huerhuero very fine sandy loam, 0 to 5 percent slopes; and Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded.

Surface runoff is medium, and the erosion hazard is moderate. The available water holding capacity is about 2 to 4 inches in the 12 to 24 inches of effective rooting depth.

This soil is used for citrus crops and field crops, for urban development, and for range. Capability unit IVe-3.

Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded (HuD2).--This is a gently rolling soil of the terraces. In contrast with Huerhuero very fine sandy loam, 0 to 5 percent slopes (HuB), it has steeper slopes, is moderately eroded, has numerous gullies in some areas, and has a surface layer 12 to 24 inches thick.

Included with this soil in mapping were areas of Azule loam; Rincon silty clay loam; San Benito clay loam; Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded; and Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 2 to 4 inches in the 12 to 24 inches of effective rooting depth.

This soil is used for citrus crops and field crops, for urban development, and for range. Capability unit IVe-3.

Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded (HuE3).--This is a strongly sloping to hilly soil of the terraces. In contrast with Huerhuero very fine sandy loam, 0 to 5 percent slopes (HuB), it has steeper slopes, is severely eroded, and contains numerous large gullies. Between gullies, the surface layer is 8 to 16 inches thick.

Included with this soil in mapping were areas of Azule loam; Rincon silty clay loam; San Benito clay loam; and Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded.

Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 1 inch to 3 inches in the 8 to 16 inches of effective rooting depth.

This soil is used for urban development and for range. Capability unit VIIe-3.

Igneous Rock Land

Igneous rock land (IrG) consists of steep and very steep mountainous areas of basalt, andesite, and volcanic breccia. It is more than 25 percent rock outcrop. The rest is covered with a thin mantle of relatively stable soil material. This land type produces only a small amount of silt and debris. It is typically nearly barren or has only a sparse brush cover.

Included with this land type in mapping were areas of Hambright very rock loam and Gullied land.

Surface runoff is very rapid, and the erosion hazard is severe. The natural drainage, subsoil permeability, available water holding capacity, inherent fertility, and effective rooting depth all vary.

This land type is used for watershed. Capability unit VIIIs-1.

Kimball Series

The Kimball series consists of well-drained sandy loams or loams that are abruptly underlain by a sandy clay subsoil. These soil formed on old terraces and benches, in alluvium derived predominantly from sedimentary rocks. They have slopes of 2 to 15 percent. Elevations range from 375 to 1,500 feet. The annual rainfall ranges from 15 to 21 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 62° F. The vegetation is annual grasses and forbs and scattered oaks.

Kimball soils occur with Ojai, Sorrecto heavy variant, Sespe, and Lodo soils. They are used for citrus crops and dryland grain, for urban development, for range, and for watershed.

Kimball sandy loam, 2 to 9 percent slopes, eroded (KmC2).--This is a gently sloping to moderately sloping soil of the terraces.

The surface layer is reddish-gray, slightly acid sandy loam about 15 inches thick. The subsoil is dark reddish-gray, slightly acid sandy clay. It extends to a depth of more than 60 inches. There is an abrupt boundary between the surface layer and the subsoil.

Representative profile located about 2,200 feet north and 2,800 feet east of SW. corner of sec. 23, T. 4 N., R. 24 W.; SBB&M.

A1--0 to 15 inches, reddish-gray (5YR 5/2) sandy loam, dark reddish brown (5YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common micro and very fine roots; very few medium, very few fine, and common micro tubular pores; slightly acid (pH 6.3); abrupt, smooth boundary.

B2t--15 to 60 inches, dark reddish-gray (5YR 4/2) sandy clay, dark reddish brown (5YR 3/3) moist; moderate, medium, prismatic and moderate, medium, angular blocky structure; very hard, firm, sticky and plastic; common micro and very few very fine roots; common micro and very few very fine tubular pores; common moderately thick clay films on ped faces and in pores; slightly acid (pH 6.3).

The A1 horizon ranges from brown through strong brown and reddish gray through yellowish red in hues of 7.5YR and 5YR. This horizon is typically sandy loam or loam in texture and in places is gravelly. It ranges from slightly acid to medium acid. In places there is an A horizon that ranges from a thin coating to 3 inches in thickness. The total thickness of the A horizon ranges from 10 to 24 inches. The B horizon ranges from pinkish gray through dark reddish gray, from light reddish brown through reddish brown, and from pale red through weak red, in hues of 5YR and 2.5YR. This horizon ranges from sandy clay through clay in texture and in places is 10 to 30 percent stones or cobblestones. It ranges from slightly acid to medium acid. Common moderately thick clay films occur on ped faces and in pores. Some profiles have, below a depth of 42 inches, a clay loam C horizon that is 50 to 75 percent gravel and cobblestones.

Included with this soil in mapping were areas of Ojai stony fine sandy loam; Ojai very fine sandy loam; Sorrento clay loam, heavy variant; Kimball sandy loam, 9 to 15 percent slopes, eroded; and a similar but unnamed soil in which the lower part of the subsoil is brittle and resembles a weak duripan.

Permeability is slow. Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The fine texture of the subsoil does not restrict root development. The available water holding capacity is about 6.5 to 9.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for citrus crops and dryland grain, for urban development, for range, and for watershed. Capability unit IIIe-3.

Kimball sandy loam, 9 to 15 percent slopes, eroded (KmD2).--This is a strongly sloping soil of the terraces. It differs from Kimball sandy loam, 2 to 9 percent slopes, eroded (KmC2), mainly in having steeper slopes.

Included with this soil in mapping were areas of Ojai stony fine sandy loam; Ojai very fine sandy loam; Sespe clay loam; Sorrento clay loam, heavy variant; and Kimball sandy loam, 2 to 9 percent slopes, eroded.

This soil is used for citrus crops and dryland grain, for urban development, for range, and for watershed. Capability unit IVe-3.

Landslides

Landslides (LaF) consists of masses of soil material that have moved downslope and the scarred surfaces resulting from such movement. This land type occurs with soils that formed in soft, weakly consolidated sedimentary material, for example, Balcom, Castaic, and Nacimiento soils. Under natural conditions it has a good vegetative cover of annual grasses and shrubs.

Natural drainage is good, and subsoil permeability is moderately slow. Surface runoff is rapid, and the erosion hazard is severe. The effective rooting depth and the available water holding capacity both vary. Inherent fertility is medium.

This land type is used for range and for watershed. Capability unit VIIe-1.

Linne Series

The Linne series consists of well-drained silty clay loams 24 to 48 inches deep over soft, calcareous shale and fine-grained sandstone. These soils formed in upland areas and have slopes of 9 to 50 percent. Elevations range from 100 to 2,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 270 to 300 days. The average annual air temperature is 60° F. The vegetation is annual grasses and forbs and a few scattered oaks.

Linne soils occur with Castaic, Balcom, Calleguas, Diablo, Nacimiento, and San Benito soils. They are used primarily for range and for field crops. Lemons are an important crop on the more gentle slopes, and urban use is increasing. Steeper areas are used for watershed and for wildlife.

Linne silty clay loam, 15 to 30 percent slopes, eroded (LeE2).--This is a hilly to moderately steep soil of the uplands.

The surface layer is gray, calcareous silty clay loam about 21 inches thick. Below this is light brownish-gray, calcareous silty clay loam. At a depth of about 48 inches is weathered, calcareous, soft shale.

Representative profile located in the vicinity of Thousand Oaks at the north end of Simi Road approximately 900 feet south and 1,500 feet east of the NW. corner of sec. 1, T. 1 N., R. 19 W., SBB&M.

A11--0 to 13 inches, gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; strong, medium, angular blocky structure; hard, firm, sticky and plastic; many micro and very few fine roots; common micro and few very fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated; clear, smooth boundary.

A12--13 to 21 inches, gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common micro and very few fine roots; common very fine and few fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and segregated in filaments; clear, wavy boundary.

C1--21 to 30 inches, light brownish-gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few micro and fine roots; common very fine and few fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and segregated in filaments; gradual, wavy boundary.

C2--30 to 40 inches, light brownish-gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few micro and very fine roots; common very fine and few fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and segregated in filaments; gradual, wavy boundary.

C3--40 to 48 inches, light brownish-gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few micro and very fine roots; few very fine tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and segregated in filaments; many soft calcareous shale fragments 1/8 inch in diameter; gradual, wavy boundary.

C4--48 inches, weathered, calcareous shale.

The A horizon ranges from gray through dark gray in hues of 2.5Y and 10YR. This horizon is silty clay loam or light clay loam in texture. It ranges from 20 to 24 inches in thickness. It is strongly to violently effervescent. In places, the uppermost 1/4 to 1/2 inch of the surface layer has granular structure. The C horizon ranges from light brownish gray through grayish brown and pale brown in hues of 2.5Y and 10YR. This horizon is silty clay loam or light clay loam in texture and in places contains a few soft shale fragments. It ranges from 10 to 27 inches in thickness. It is moderately alkaline and is violently to strongly effervescent. The depth to soft bedrock ranges from 30 to 48 inches. The rock is typically soft shale but in places is fine-grained sandstone.

Included with this soil in mapping were areas of Calleguas shaly loam; Castaic-Balcom complex;

Nacimiento silty clay loam; and an unnamed soil, on ridgetops east of Grimes Canyon, that is light gray to light brownish gray and is about 15 inches deep over rock. Also included were a few areas of soils that have detached stones throughout the profile and on as much as 3 percent of the surface. Representative areas of this inclusion are near the intersection of Tierra Rejada Road and California Highway 23, and in the hills between the town of Simi and Happy Camp Canyon.

Permeability is moderately slow. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 6 to 9 inches in the 30 to 48 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily as range. Small acreages are in citrus crops and small grain. Urban development is increasing. Preventing landslips and stabilizing roads are problems in developing homesites. Capability unit IVe-1.

Linne silty clay loam, 9 to 15 percent slopes, eroded (LeD2).--This is a rolling to strongly sloping soil of the hills. It differs from Linne silty clay loam, 15 to 30 percent slopes, eroded (LeE2), mainly in having more gentle slopes.

Included with this soil in mapping were areas of Calleguas shaly loam, Diablo clay, Nacimiento silty clay loam, and Santa Lucia shaly silty clay loam.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used mainly for citrus crops and dryland grain and for range. Urban development is increasing. Capability unit IIIe-1.

Linne silty clay loam, 30 to 50 percent slopes, eroded (LeF2).--This is a steep soil of the uplands. In contrast with Linne silty clay loam, 15 to 30 percent slopes, eroded (LeE2), it has steeper slopes and is 24 to 36 inches deep.

Included with this soil in mapping were areas of Calleguas shaly clay loam; Castaic-Balcom complex; Nacimiento silty clay loam; and a similar but unnamed soil, on the ridges east of Grimes Canyon, that is light gray or light brownish gray and about 15 inches deep over rock.

Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 5 to 7 inches in the 24 to 36 inches of effective rooting depth.

This soil is used mainly for range and for watershed. Capability unit VIe-1.

Lodo Series

The Lodo series consists of somewhat excessively drained heavy loams 8 to 20 inches deep over hard shale. These soils formed in upland areas and have slopes of 30 to 50 percent. Elevations range from 300 to 2,000 feet. The annual rainfall ranges from 18 to 22 inches, and the frost-free season from 250 to 280 days. The average annual air temperature is 61° F. The vegetation is thick brush and annual grasses.

Lodo soils occur with Kimball, Sespe, and Ojai soils and Sedimentary rock land. They are used primarily for range and for watershed.

Lodo rocky loam, 30 to 50 percent slopes (LkF).--This is a steep soil of the uplands. Rock outcrops cover 2 to 10 percent of the area.

The upper part of the surface layer is reddish-brown, slightly acid heavy loam, and the lower part is medium acid gravelly light clay loam. At a depth of about 16 inches is hard, fractured, reddish-brown shale.

Representative profile located about 4,900 feet south and 1,400 feet west of SW. corner of sec. 4, T. 4 N., R. 22 W., SBB&M.

A11--0 to 9 inches, reddish-brown (5YR 5/3) heavy loam, dark reddish brown (5YR 3/2) moist; moderate, medium, subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium roots; many very fine tubular pores; slightly acid (pH 6.5); gradual, smooth boundary.

A12--9 to 16 inches, reddish-brown (5YR 5/3) gravelly light clay loam, approximately 25 percent gravel 2 to 10 millimeters in size, dark reddish gray (5YR 4/2) moist; moderate, medium, subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many medium to fine and common very fine roots; common very fine irregular and tubular pores; medium acid (pH 6.0); clear, smooth boundary.

R--16 inches, hard, fractured, reddish-brown shale.

The A horizon is typically reddish gray, reddish brown, or brown in hues of 5YR or 7.5YR but in a few places is grayish brown or brown in hue of 10YR. This horizon is typically heavy loam in texture but in places is light clay loam. It is 10 to 25 percent gravel 2 to 10 millimeters in size. It ranges from medium acid to neutral. Depth to hard, fractured sandstone or shale ranges from 8 to 20 inches. The Lodo soils in this Area are typically redder than the Lodo soils mapped elsewhere in California, because they were derived from red shale.

Included with this soil in mapping were areas of Sedimentary rock land; Ojai stony fine sandy loam; Sespe clay loam; and an unnamed soil that is lighter colored but is otherwise similar to the Lodo soil.

Permeability is moderate. Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 1.2 to 3.5 inches in the 8 to 20 inches of effective rooting depth. Inherent fertility is low.

This soil is used primarily for range and for watershed. Capability unit VIIe-8.

Los Osos Series

The Los Osos series consists of well-drained clay loams that have a clay subsoil and are 22 to 48 inches deep over sandstone or shale. These soils

developed in upland areas and have slopes of 9 to 50 percent. Elevations range from 100 to 2,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 270 to 300 days. The average annual air temperature is 60° F. The vegetation is annual grasses and forbs and brush and scattered oaks.

Los Osos soils occur with Malibu, Gazos, Millsholm, Rincon, Soper, and San Benito soils. They are used for range, for watershed, and for citrus crops and field crops. The more gentle slopes are used for urban development.

Los Osos clay loam, 30 to 50 percent slopes (LoF).--This is a steep soil of the uplands.

The surface layer is dark-brown, slightly acid clay loam about 9 inches thick. The subsoil is dark-brown, slightly acid and neutral clay about 20 inches thick. This layer grades to decomposed shale at a depth of 36 inches.

Representative profile located 600 feet west and 2,200 feet north of SE. corner of sec. 21, T. 2 N., R. 18 W., SBB&M.

A11--0 to 2 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate, fine, granular structure; hard, firm, sticky and plastic; many fine and very fine roots; many very fine irregular pores; slightly acid (pH 6.2); abrupt, smooth boundary.

A12--2 to 9 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate to medium subangular blocky structure; hard, firm, sticky and plastic; common micro, common very fine, and few fine and medium roots; common very fine irregular pores and common very fine and fine tubular pores; slightly acid (pH 6.5); gradual, wavy boundary.

B1t--9 to 15 inches, dark-brown (10YR 4/3) light clay, dark brown (10YR 3/3) moist; moderate, medium, subangular blocky structure; very hard, very firm, very sticky and very plastic; few micro, very fine, fine, and medium roots; common very fine tubular pores; common thin clay films on ped faces, and continuous thin clay films in pores; slightly acid (pH 6.5); gradual, wavy boundary.

B2t--15 to 29 inches, dark-brown (10YR 3/3) clay, very dark brown (10YR 2/3) moist; strong, medium, subangular blocky structure; extremely hard, very firm, very sticky and very plastic; few very fine and very few fine roots; common very fine and fine tubular pores; continuous moderately thick clay films on ped faces, and continuous thick clay films in pores; neutral (pH 7.0); gradual, wavy boundary.

CR--29 to 36 inches, dark-brown (10YR 4/3) clay loam containing brownish-yellow (10YR 6/6) shale chips, dark brown (10YR 3/3) and yellowish brown (10YR 5/6) moist; massive; very hard, very firm, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; continuous moderately thick clay films in pores; neutral (pH 7.0); broken, irregular boundary.

R--36 inches, gray (10YR 6/1) and yellowish-brown decomposed shale; neutral (pH 7.0); some hard, gray (10YR 6/1) sandstone that is calcareous in cracks and on rock faces.

The A horizon is grayish brown, dark grayish brown, dark brown, or brown in hue of 10YR. This horizon is typically clay loam in texture but in places is heavy loam or light sandy clay loam. It is 8 to 20 inches thick. It ranges from slightly acid to medium acid. The B horizon is dark grayish brown, brown, yellowish brown, or dark brown in hue of 10YR. It ranges from heavy clay loam to clay in texture; the percentage of clay is more than 35 percent. This horizon ranges from 14 to 28 inches in thickness. Some profiles have a thin CR, C, or B3 horizon. In places lime occurs in seams and cracks of the sandstone and shale. In many places these rocks are bedded or banded. They are typically at a depth of 22 to 48 inches.

Included with this soil in mapping were areas of Malibu loam, Gazos silty clay loam, Millsholm loam, Soper gravelly loam, San Benito clay loam, and Los Osos clay loam.

Permeability is slow. Surface runoff is rapid, and the erosion hazard is severe. The fine-textured subsoil does not restrict root development. The available water holding capacity is about 3.5 to 8 inches in the 22 to 48 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for range and for watershed. Capability unit VIe-1.

Los Osos clay loam, 9 to 15 percent slopes, eroded (LoD2).--This is a strongly sloping soil of the uplands. It differs from Los Osos clay loam, 30 to 50 percent slopes (LoF), in having more gentle slopes, a few gullies, evidence of sheet and rill erosion, and a surface layer 12 to 20 inches thick.

Included with this soil in mapping were areas of Malibu loam; Rincon silty clay loam; San Benito clay loam; and Los Osos clay loam, 15 to 30 percent slopes, eroded.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used primarily for citrus crops, for urban development, and for range. Field crops are grown on the more gentle slopes. Capability unit IIIe-1.

Los Osos clay loam, 15 to 30 percent slopes, eroded (LoE2).--This is a moderately steep soil of the uplands. It differs from Los Osos clay loam, 30 to 50 percent slopes (LoF), in having more gentle slopes, evidence of sheet and rill erosion, and a few gullies.

Included with this soil in mapping were areas of Malibu loam; Gazos silty clay loam; Millsholm loam; Rincon silty clay loam; San Benito clay loam; Soper loam; Los Osos clay loam, 9 to 15 percent slopes, eroded; and Los Osos clay loam, 30 to 50 percent slopes.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe.

This soil is used for citrus crops, for urban development, for range, and for watershed. Capability unit IVe-1.

Malibu Series

The Malibu series consists of well-drained loams that are abruptly underlain by a clay subsoil and are 23 to 36 inches deep over sandstone and shale. These soils developed in upland areas and have slopes of 9 to 50 percent. Elevations range from 100 to 2,500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 270 to 300 days. The average annual air temperature is 60° F. The vegetation is brush and scattered oaks and an understory of annual grasses.

Malibu soils occur with Los Osos and Millsholm soils. They are used primarily for range and for watershed. Urban use is increasing on the more gentle slopes.

Malibu loam, 9 to 15 percent slopes, eroded (MaD2).--This is a strongly sloping and rolling soil of the uplands.

The surface layer is brown, medium acid loam about 14 inches thick. The subsoil is yellowish-red, medium acid clay about 9 inches thick. There is an abrupt boundary between the surface layer and the subsoil. At a depth of about 23 inches is hard, fractured shale and sandstone.

Representative profile located 100 feet north and 1,200 feet east of SW. corner of sec. 16, T. 1 S., R. 20 W., SBB&M.

A11--0 to 2 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; moderate, fine, granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many micro and common very fine, fine, and medium roots; common micro and very fine tubular pores; medium acid (pH 6.0); abrupt, smooth boundary.

A12--2 to 14 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; moderate, medium, subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common micro, common very fine, and few fine and medium roots; common micro, common very fine, and very few fine and medium tubular pores; medium acid (pH 6.0); abrupt, smooth boundary.

B2t--14 to 23 inches, yellowish-red (5YR 4/6) clay, dark reddish brown (5YR 3/4) moist; weak, very coarse, prismatic and moderate, medium, angular blocky structure; very hard, firm, sticky and plastic; common micro and very fine roots; few micro and very fine tubular pores; many moderately thick clay films on ped faces and in tubular pores; medium acid (pH 6.0); gradual, irregular boundary.

R--23 to 32 inches, hard, fractured shale and sandstone; few moderately thick clay films in cracks.

The A horizon ranges from brown through grayish brown and dark grayish brown in hues of 10YR and 7.5YR. This horizon is typically loam in texture but in places is light clay loam. It ranges from 14 to 18 inches in thickness. It is slightly acid to medium acid. The boundary between the A and B horizons is abrupt or very abrupt, and the increase in clay is more than 20 percent. The B horizon ranges from yellowish red to red or reddish brown in hues of 5YR and 2.5YR. This horizon is 10 to 15 percent gravel-size fragments of shale and sandstone. It ranges from 9 to 18 inches in thickness. It is medium acid to strongly acid. Depth to the hard, fractured shale and sandstone ranges from 23 to 36 inches.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam; Los Osos clay loam; Malibu loam, 15 to 30 percent slopes, eroded; and Millsholm loam.

Permeability is very slow. Surface runoff is medium, and the erosion hazard is moderate. The fine texture of the subsoil does not favor the development of an extensive root system; roots occur mainly along cracks. The available water holding capacity is about 3.5 to 5 inches in the 23 to 36 inches of rooting depth. Inherent fertility is moderate.

This soil is used primarily for urban development, for range, and for watershed. Capability unit IVe-3.

Malibu loam, 15 to 30 percent slopes, eroded (MaE2).--This is a moderately steep or hilly soil of the uplands. It differs from Malibu loam, 9 to 15 percent slopes, eroded (MaD2), mainly in having steeper slopes.

Included with this soil in mapping were areas of Huerhuero very fine sandy loam; Los Osos clay loam; Malibu loam, 30 to 50 percent slopes; and Millsholm loam.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe.

This soil is used primarily for watershed. A small acreage is used for range. Capability unit VIe-3.

Malibu loam, 30 to 50 percent slopes (MaF).--This is a steep soil of the uplands. In contrast with Malibu loam, 9 to 15 percent slopes, eroded (MaD2), it has steeper slopes, is less eroded, has a surface layer 12 to 20 inches thick, and is 23 to 30 inches thick over bedrock.

Included with this soil in mapping were areas of Los Osos clay loam; Malibu loam, 15 to 30 percent slopes, eroded; and Millsholm loam.

Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 3.5 to 4.5 inches in the 23 to 30 inches of rooting depth.

This soil is used primarily for watershed. A small acreage is used for range. Capability unit VIIe-3.

Metz Series

The Metz series consists of somewhat excessively drained, calcareous, loamy sands and loamy fine sands 60 inches or more deep. These soils formed on alluvial plains and fans, in stratified alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 1,000 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from 300 to 340 days. The average annual air temperature is 62° F. The vegetation is annual grasses and forbs.

Metz soils occur with Anacapa, Corralitos, Hueneme, and Pico soils. They are used for vegetables, strawberries, walnuts, avocados, citrus crops, and field crops, and for urban development. Small areas are used for range.

Metz loamy sand, 0 to 2 percent slopes (MeA).--This is a level to nearly level soil of the alluvial plains and fans.

The surface layer is pale-brown, calcareous loamy sand about 7 inches thick. Below this is stratified, light brownish-gray, calcareous sand and sandy loam.

Representative profile located about 1,600 feet south and 1,300 feet east of NW. corner of sec. 9, T. 2 N., R. 19 W., SBB&M.

A--0 to 7 inches, pale-brown (10YR 6/3) loamy sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common micro roots; many fine irregular pores; moderately alkaline (pH 8.0) and slightly effervescent; lime disseminated; abrupt, wavy boundary.

C1--7 to 24 inches, light brownish-gray (2.5Y 6/2) sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; many fine irregular pores; moderately alkaline (pH 8.0) and slightly effervescent; lime disseminated; abrupt, smooth boundary.

C2--24 to 31 inches, light brownish-gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; many fine irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated; abrupt, smooth boundary.

C3--31 to 36 inches, light brownish-gray (2.5Y 6/2) sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; many fine irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated; abrupt, smooth boundary.

C4--36 to 46 inches, light brownish-gray (2.5Y 6/2) sand, grayish brown (2.5Y 5/2) moist; single grain, loose, nonsticky and nonplastic; many fine irregular pores; moderately alkaline (pH 8.0) and slightly effervescent; lime disseminated; abrupt, smooth boundary.

C5--46 to 60 inches, light brownish-gray (2.5Y 6/2) sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; many fine irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated.

The A horizon ranges from light brownish gray through grayish brown, or from pale brown through brown in hues of 10YR and 2.5Y. It is loamy sand or fine sand in texture and ranges from 7 to 10 inches in thickness. It ranges from mildly alkaline to moderately alkaline. The C horizon ranges from light brownish gray through light yellowish brown or from grayish brown through yellowish brown or light olive brown in hues of 10YR and 2.5Y. This horizon is stratified; in texture it ranges from sand and loamy sand to sandy loam that has thin lenses of silty material. It is mildly alkaline to moderately alkaline. The Metz soil is typically calcareous throughout the profile, but in a few places the uppermost few inches of the surface layer and the coarser textured strata are noncalcareous. Buried horizons of unrelated soils are common. Below a depth of 42 inches are strata that are as much as 25 percent gravel and cobblestones.

Included with this soil in mapping were areas of Anacapa sandy loam; Corralitos loamy sand; Hueneme sandy loam; Pico sandy loam; Metz loamy sand, loamy substratum; and Metz loamy fine sand, 0 to 2 percent slopes.

Permeability is rapid. Surface runoff is very slow, and there is no erosion hazard. The available water holding capacity is 4 to 5 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used primarily for vegetables, strawberries, walnuts, avocados, citrus crops, and field crops, and for urban development. Small areas are used for range. Capability unit IIIs-4.

Metz loamy sand, 2 to 9 percent slopes (MeC).--This is a gently sloping to moderately sloping soil of the alluvial plains and fans. It differs from Metz loamy sand, 0 to 2 percent slopes (MeA), mainly in having steeper slopes.

Included with this soil in mapping were areas of Anacapa sandy loam; Corralitos loamy sand; Cortina stony sandy loam; Metz loamy fine sand; Metz loamy sand, 0 to 2 percent slopes; and Pico sandy loam.

Surface runoff is slow, and the erosion hazard is slight.

This soil is used mainly for field crops, citrus crops, and walnuts, and for urban development. Vegetables and strawberries are grown on the more gentle slopes. Small areas are used for range. Capability unit IIIs-4.

Metz loamy sand, loamy substratum, 0 to 2 percent slopes (MfA).--This is a nearly level soil of the alluvial plains and fans. In contrast with Metz loamy sand, 0 to 2 percent slopes (MeA), this soil is typically stratifed with silt loam to loamy very fine sand below a depth of 40 inches.

Included with this soil in mapping were areas of Anacapa sandy loam; Corralitos loamy sand; Hueneme loamy sand, loamy substratum; Metz loamy sand; Metz loamy fine sand; and Pico sandy loam.

Permeability is moderately rapid. The available water holding capacity is 5 to 6 inches in the 60 inches of effective rooting depth. In the loamy substratum, permeability decreases and the available water holding capacity increases. In places a temporary perched water table forms after a rain or a heavy application of irrigation water.

This soil is used mainly for vegetables, field crops, citrus crops, walnuts, and strawberries, and for urban development. Small areas are used for range. Capability unit IIs-4.

Metz loamy fine sand, 0 to 2 percent slopes (McA).--This is a nearly level soil of the alluvial plains and fans. It differs from Metz loamy sand, 0 to 2 percent slopes (MeA), in having less stratification and a texture that is predominantly loamy fine sandy throughout the profile.

Included with this soil in mapping were areas of Anacapa sandy loam; Corralitos loamy sand; Hueneme loamy sand, loamy substratum; Metz loamy sand; Metz loamy sand, loamy substratum; and Pico sandy loam.

The available water holding capacity is 5 to 6 inches in the 60 inches of effective rooting depth.

This soil is used primarily for vegetables, citrus crops, field crops, strawberries, walnuts, and avocados, and for urban development. Small areas are used for range. Capability unit IIs-4.

Metz loamy fine sand, 2 to 9 percent slopes (McC).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Metz loamy sand, 0 to 2 percent slopes (MeA), mainly in having steeper slopes, less stratification and a texture that is predominantly loamy fine sand throughout the profile.

Included with this soil in mapping were areas of Anacapa sandy loam; Corralitos loamy sand; Metz loamy sand; Metz loamy fine sand, 0 to 2 percent slopes; and Pico sandy loam.

Surface runoff is slow, and the erosion hazard is slight. The available water holding capacity is 5 to 6 inches in the 60 inches of effective rooting depth.

This soil is used primarily for citrus crops, field crops, walnuts, and avocados, and for urban development. Vegetables and strawberries are grown on the more gentle slopes. Small areas are used for range. Capability unit IIs-4.

Millsholm Series

The Millsholm series consists of well-drained loams 10 to 20 inches deep over sandstone or shale. These soils formed in upland areas and have slopes of 15 to 75 percent. Elevations range from 500 to 2,500 feet. The annual rainfall ranges from 15 to 20 inches, and the frost-free season from 250 to 270 days. The average annual air temperature is 60° F. The vegetation is brush and scattered oaks and an understory of annual grasses.

Millsholm soils occur with Los Osos and Malibu soils. They are used primarily for range and for watershed.

Millsholm loam, 15 to 50 percent slopes (MhF).--This is a moderately steep to steep soil of the uplands.

The surface layer is brown, medium acid loam about 13 inches thick. The subsoil is brown, medium acid light clay loam about 5 inches thick. At a depth of about 18 inches is hard, well-fractured shale.

Representative profile located near Deer Creek Road, 1,000 feet south and 300 feet east of NW. corner of sec. 16, T. 1 S., R. 20 W., SBB&M.

A11--0 to 3 inches, brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate, medium, granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common micro, few very fine, and very few fine roots; common micro and few very fine tubular pores; medium acid (pH 6.0); gradual, wavy boundary.

A12--3 to 13 inches, brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak, medium, granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few micro, very few very fine, and very few fine and medium roots; common micro, common very fine, and few fine and medium pores; medium acid (pH 6.0); clear, wavy boundary.

B2--13 to 18 inches, brown (10YR 5/3) light clay loam, dark brown (10YR 4/3) moist; approximately 10 to 15 percent shale fragments; massive; hard, friable, slightly sticky and plastic; few micro and very few very fine and fine roots; common micro, common very fine, and few fine and medium pores; very few thin clay films in some tubular pores; medium acid (pH 6.0); clear, irregular boundary.

R--18 inches, hard, well-fractured shale; in places roots extend along cracks in the shale.

The A horizon ranges from brown through grayish brown or dark grayish brown in hue of 10YR. This horizon ranges from loam to light clay loam in texture and from 8 to 13 inches in thickness. It is typically massive, but in places the uppermost 2 inches is weak angular blocky. The B horizon ranges from brown or dark grayish brown through dark yellowish brown in hues of 10YR and 7.5YR. This horizon is 15 percent shale fragments. It ranges from 2 to 7 inches in thickness. The hard, fractured shale or sandstone occurs at a depth of 10 to 20 inches. The profile ranges from neutral to medium acid.

Included with this soil in mapping were areas of Malibu loam; Millsholm very rocky loam, 30 to 75 percent slopes; an unnamed slightly deeper and calcareous soil; and Gazos soils, which are south of Lime Canyon near Lake Piru.

Permeability is moderately slow. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is 1.5 to 3 inches in the 10 to 20 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for range and for watershed. Capability unit VIIe-8.

Millsholm very rocky loam, 30 to 75 percent slopes (MkG).--This is a steep to very steep soil of the mountainous uplands. In contrast with Millsholm loam, 15 to 50 percent slopes (MhF), this soil has steeper slopes and 10 to 25 percent of the acreage is exposed bedrock.

Included with this soil in mapping were areas of Malibu loam; Millsholm loam, 15 to 50 percent slopes; and Soper gravelly loam. In the Grimes Canyon area at the approximate 1/4 corner between sections 7 and 18, T. 3 N., R. 19 W., is about 300 acres of soils that have but little profile development, are calcareous throughout, and are 7 to 20 inches deep over siliceous shale of low bulk density or burnt sandstone. Typically the soils over the light-weight shale are silt loam in texture and when dry are gray and light gray in hues of 10YR and 2.5Y. Those over the burnt sandstone are sandy loam and loam in texture and when dry are dark reddish gray or brown in hues of 7.5YR and 5YR. The underlying siliceous shale is easily cut with hand tools and ranges to hard but well-fractured burnt sandstone. When dry the light-weight shale is typically very pale brown, and the sandstone ranges from pink to light reddish brown and weak red in hues of 7.5YR, 2.5YR, and 10R.

Surface runoff is rapid to very rapid, and the erosion hazard is severe to very severe.

This soil is used for range and for watershed. The metamorphosed sandstone and shale in Grimes Canyon is being mined for decorative rock. Capability unit VIIs-8.

Millsholm-Malibu complex, 30 to 50 percent slopes, eroded (MmF2).--About 45 percent of this mapping unit is Millsholm loam, 45 percent Malibu loam, and the rest Gaviota soils and Sedimentary rock land. This mapping unit is in mountainous uplands, mainly in the Santa Monica Mountains, extending from the Ventura-Los Angeles County line to the Oxnard plains.

Sheet erosion has removed 25 to 75 percent of the original surface layer and there are shallow gullies, but the Millsholm soil otherwise resembles Millsholm loam, 15 to 50 percent slopes (MhF), and the Malibu soil resembles Malibu loam, 9 to 15 percent slopes, eroded (MaD2). The Millsholm soil is 10 to 20 inches deep over shale, and the Malibu soil, 23 to 30 inches. Permeability is moderately slow for the Millsholm soil and very slow for the Malibu soil. Surface runoff is rapid for both, and the erosion hazard is severe. The Millsholm soil has an available water holding capacity of 1.5 to 3 inches in its 10 to 20 inches of rooting depth, as compared with 3.5 to 4.5 inches for the Malibu soil, which has a rooting depth of 23 to 30 inches. Inherent fertility is medium for both soils.

This complex is used mainly for watershed. Small areas are used for range. Capability unit VIIe-8 for Millsholm soil, and VIIe-3 for Malibu.

Mocho Series

The Mocho series consists of well-drained loams, gravelly loams, and clay loams 60 inches or more deep. These soils formed on alluvial plains and fans, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 100 to 1,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 280 to 350 days. The average annual air temperature is 62° F. The vegetation is annual grasses and forbs.

Mocho soils occur with Anacapa, Camarillo, Garretson, Hueneme, Salinas, and Sorrento soils. They are used for vegetables, citrus crops, avocados, field crops, and walnuts, for urban development, and for range.

Mocho loam, 0 to 2 percent slopes (MoA).--This is a nearly level soil of the alluvial plains and fans.

The surface layer is grayish-brown, calcareous loam about 16 inches thick. Below this is grayish-brown and light brownish-gray, calcareous loam that extends to a depth of 60 inches or more.

Representative profile located about 900 feet west and 200 feet north of the intersection of Los Angeles Avenue (California Highway 118) and Bradley Road.

Ap--0 to 10 inches, grayish-brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; moderate, medium, granular structure; slightly hard, friable, slightly sticky and plastic; very few medium, few fine, and common very fine roots; few fine and many very fine tubular pores; moderately alkaline (pH 8.0) and effervescent; lime disseminated; clear, abrupt boundary.

A1--10 to 16 inches, grayish-brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; massive or weak, medium, subangular blocky structure; slightly hard, friable, slightly sticky and plastic; very few medium, very few fine, and common very fine roots; very few fine and common very fine tubular pores; moderately alkaline (pH 8.0) and effervescent; lime disseminated; worm casts present; clear, abrupt boundary.

C1ca--16 to 34 inches, grayish-brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, slightly sticky and plastic; very few medium, very few fine, and common very fine roots; few fine and many very fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated in nodules and filaments; worm casts present; clear, wavy boundary.

C2ca--34 to 60 inches, light brownish-gray (2.5Y 6/2) loam; dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, slightly sticky and plastic; very few fine and common very fine roots; few fine and many very fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated into nodules and filaments; worm casts present.

The A horizon is grayish brown or dark grayish brown in hues of 10YR and 2.5Y. This horizon ranges from fine sandy loam to silty clay loam in texture and is 18 to 35 percent clay. It ranges from 14 to 20 inches in thickness. It is moderately alkaline and is typically calcareous; in places the uppermost few inches is noncalcareous. The C horizon is light brownish gray or grayish brown in hues of 10YR and 2.5Y. This horizon ranges from fine sandy loam to silty clay loam in texture and is 18 to 35 percent clay. It is moderately alkaline and is calcareous.

Included with this soil in mapping were small areas of Anacapa sandy loam; Garretson loam; Hueneme sandy loam; Sorrento loam; and Mocho loam, 2 to 9 percent slopes.

Permeability is moderate. Surface runoff is slow, and there is no erosion hazard. The available water holding capacity is about 8 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for vegetables, field crops, citrus crops, avocados, and walnuts, for urban development, and for range. Capability unit I-1.

Mocho loam, 2 to 9 percent slopes (MoC).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Mocho loam, 0 to 2 percent slopes (MoA), mainly in having steeper slopes.

Included with this soil in mapping were small areas of Anacapa sandy loam; Garretson loam; Mocho loam, 0 to 2 percent slopes; Pico sandy loam; and Sorrento loam.

Runoff is slow to medium, and the erosion hazard is slight to moderate. This soil is used for citrus crops, avocados, field crops, and walnuts, for urban development, and for range. The more gentle slopes are used for vegetables. Capability unit IIe-1.

Mocho gravelly loam, 2 to 9 percent slopes (MrC).--This is a gently sloping to moderately sloping soil of the alluvial fans. In contrast with Mocho loam, 0 to 2 percent slopes (MoA), this soil has steeper slopes; is 15 to 25 percent gravel, 2 to 5 millimeters in size, throughout the profile; and in places ranges to gravelly clay loam in texture.

Included with this soil in mapping were small areas of Anacapa gravelly sandy loam, Garretson gravelly loam, Mocho loam, Mocho clay loam, and Sorrento loam.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is 6 to 8 inches in the 60 inches of effective rooting depth.

This soil is used for citrus crops, avocados, field crops, and walnuts, for urban development, and for range. Capability unit IIe-1.

Mocho clay loam, 0 to 2 percent slopes (MsA).--This is a nearly level soil of the alluvial plains and fans. In contrast with Mocho loam, 0 to 2 percent slopes (MoA), this soil is clay loam in texture throughout the profile and tends to be dark grayish brown in color.

Included with this soil in mapping were areas of Garretson loam; Mocho loam; Mocho clay loam, 2 to 5 percent slopes; Salinas clay loam; and Sorrento silty clay loam.

Permeability is moderately slow. The available water holding capacity is about 10 to 12 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for avocados, citrus crops, field crops, walnuts, and vegetables, for urban development, and for range. Capability unit I-1.

Mocho clay loam, 2 to 5 percent slopes (MsB).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Mocho loam, 0 to 2 percent slopes (MoA), in having clay loam texture throughout the profile and steeper slopes.

Included with this soil in mapping were small areas of Garretson loam; Garretson silt loam, calcareous variant; Mocho clay loam, 0 to 2 percent slopes; Mocho loam, 2 to 9 percent slopes; Salinas clay loam; and Sorrento silty clay loam.

Permeability is moderately slow. Surface runoff is slow, and the erosion hazard is slight. The available water holding capacity is about 10 to 12 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for avocados, citrus crops, field crops, walnuts, and vegetables, for urban development, and for range. Capability unit IIe-1.

Nacimiento Series

The Nacimiento series consists of well-drained, calcareous silty clay loams 24 to 40 inches deep over soft to firm shale. These soils formed in upland areas and have slopes of 9 to 75 percent. Elevations range from 100 to 2,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 270 to 300 days. The average annual air temperature is 61° F. The vegetation is annual grasses, brush, and a few scattered oaks.

Nacimiento soils occur with Balcom, Diablo, Linne, and San Benito soils. They are used primarily for range and for watershed. The more gentle slopes are used for citrus crops, avocados, and field crops, and for urban development.

Nacimiento silty clay loam, 30 to 50 percent slopes (NaF).--This is a steep soil of the uplands.

The surface layer is grayish-brown, calcareous silty clay loam about 13 inches thick. The next layer also is grayish-brown, calcareous silty clay

loam about 17 inches thick. Below this is firm, calcareous shale.

Representative profile located about 9,600 feet south and 3,900 feet east of NW. corner of sec. 23, T. 3 N., R. 23 W., SBB&M.

A--0 to 13 inches, grayish-brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate, medium and fine, granular structure; hard, friable, slightly sticky and slightly plastic; common micro and very fine roots; common micro and very fine irregular pores; moderately alkaline (pH 8.2) and very slightly effervescent; lime disseminated; gradual, wavy boundary.

C1ca--13 to 30 inches, grayish-brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few micro, few very fine, and very few fine roots; common micro and very fine tubular pores; moderately alkaline (pH 8.2) and strongly effervescent; lime disseminated and segregated in fine filaments; gradual, wavy boundary.

C2--30 inches, firm, calcareous shale.

The A horizon is grayish brown and dark grayish brown in hues of 10YR and 2.5Y. This horizon is typically silty clay loam in texture but in places is clay loam. It ranges from 12 to 20 inches in thickness. The C1 horizon ranges from light brownish gray through light yellowish brown, and from grayish brown through yellowish brown and light olive brown in hues of 10YR and 2.5Y. This horizon is similar to the A horizon in texture and ranges from 12 to 20 inches in thickness. In places there are a few thin patchy clay films and a few narrow cracks. The depth to the underlying rock ranges from 24 to 40 inches. In some areas the rock is soft to firm shale, in some hard shale, and in others fine-grained sandstone. Except for the uppermost few inches, the entire profile is calcareous.

Included with this soil in mapping were areas of Diablo clay; Linne silty clay loam; Nacimiento silty clay loam, 15 to 30 percent slopes, eroded; Nacimiento silty clay loam, 50 to 75 percent slopes; and San Benito clay loam.

Permeability is moderately slow. Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 4 to 6.5 inches in the 24 to 40 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for range and for watershed. Capability unit VIe-1.

Nacimiento silty clay loam, 9 to 15 percent slopes, eroded (NaD2).--This is a strongly sloping soil of the uplands. It differs from Nacimiento silty clay loam, 30 to 50 percent slopes (NaF), mainly in having more gentle slopes and in being moderately eroded.

Included with this soil in mapping were areas of Diablo clay; Linne silty clay loam; Nacimiento silty clay loam, 15 to 30 percent slopes, eroded; and San Benito clay loam.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used for avocados, field crops, citrus crops, and dryland grain, for urban development, and for range. Capability unit IIIe-1.

Nacimiento silty clay loam, 15 to 30 percent slopes, eroded (NaE2).--This is a moderately steep soil of the uplands. It differs from Nacimiento silty clay loam, 30 to 50 percent slopes (NaF), mainly in having more gentle slopes and in being moderately eroded.

Included with this soil in mapping were small areas of Diablo clay; Linne silty clay loam; Nacimiento silty clay loam, 9 to 15 percent slopes, eroded; Nacimiento silty clay loam, 30 to 50 percent slopes; and San Benito clay loam.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. This soil is used for urban development, for range, for watershed, and for citrus crops and dryland grain. Capability unit IVe-1.

Nacimiento silty clay loam, 50 to 75 percent slopes (NaG).--This is a very steep soil of the uplands. It differs from Nacimiento silty clay loam, 30 to 50 percent slopes (NaF), mainly in having steeper slopes.

Included with this soil in mapping were small areas of Linne silty clay loam; Nacimiento silty clay loam, 30 to 50 percent slopes; and San Benito clay loam.

Surface runoff is very rapid, and the erosion hazard is very severe.

This soil is used mainly for range and for watershed. Capability unit VIIe-1.

Ojai Series

The Ojai series consists of well-drained very fine sandy loams or stony fine sandy loams that have a sandy clay loam subsoil. These soils formed on old, partially dissected terraces, in alluvium derived from sedimentary rocks. They have slopes of 0 to 30 percent. Elevations range from 100 to 1,700 feet. The annual rainfall ranges from 14 to 21 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 61° F. The vegetation is annual grasses, brush, and scattered oaks.

Ojai soils occur with Kimball, Lodo, and Sespe soils. They are used for avocados, citrus crops, and dryland grain, for urban development, and for range.

Ojai very fine sandy loam, 0 to 2 percent slopes (OhA).--This is a nearly level or level soil of the old terraces.

The surface layer is brown, medium acid and slightly acid very fine sandy loam about 16 inches thick. The subsoil is reddish-brown, slightly acid sandy clay loam in the uppermost 20 inches. At a depth of about 36 inches, it is light reddish-brown, slightly acid, very cobbly and gravelly light clay.

Representative profile located west of Meiners Oaks near the Ventura River; 3/10 mile south of El Roblar Drive on Rice Road, and 60 feet east at edge of farm road.

Ap--0 to 7 inches, brown (7.5YR 5/4) very fine sandy loam, dark brown (7.5YR 3/2) moist; loose powdery in uppermost 1 to 2 inches, massive in middle part, and weak, coarse, platy structure in lower part; very hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine irregular pores and few very fine and common fine tubular pores in lowermost 2 to 4 inches; few coarse blotches of mycelial mold; medium acid (pH 6.0); gradual, wavy boundary.

A12--7 to 12 inches, brown (7.5YR 5/4) very fine sandy loam, dark reddish brown (5YR 3/3) moist; weak, medium, subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores and many very fine, common fine, and few medium tubular pores; slightly compacted as a result of tillage; medium acid (pH 6.0); clear, smooth boundary.

A3--12 to 16 inches, brown (7.5YR 5/4) very fine sandy loam, dark reddish brown (5YR 3/3) moist; weak, medium and coarse, subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; few very fine roots that tend to flatten out on top of the B1t; many very fine irregular pores and common very fine and many fine and medium tubular pores; slightly acid (pH 6.2); clear, wavy boundary.

B1t--16 to 25 inches, reddish-brown (5YR 5/4) light sandy clay loam, dark reddish brown (5YR 3/4) moist; weak, medium and coarse, angular blocky structure; very hard, firm, sticky and plastic; somewhat brittle when moist; very few very fine roots; many micro irregular pores and common very fine and few fine tubular pores; common thick and few moderately thick clay films on ped faces; a little rotten gravel; slightly acid (pH 6.5); gradual, smooth boundary.

B2t--25 to 36 inches, reddish-brown (5YR 5/4 dry or moist) heavy sandy clay loam; very weak, coarse, prismatic to moderate, medium and coarse, angular blocky structure; very hard, firm, sticky and plastic; somewhat brittle when moist; very few very fine roots on ped faces; common very fine irregular pores and few very fine tubular pores; continuous moderately thick clay films (5YR 5/4 dry, 3/4 moist) on ped faces, clay nearly fills pores; a few black manganese (?) stains on ped faces; a little rotten gravel; slightly acid (pH 6.2); clear, smooth boundary.

IIB3t--36 to 55 inches, light reddish-brown (5YR 6/4) very cobbly and gravelly light clay, reddish brown (5YR 4/4) moist; 75 percent cobblestones and gravel; massive; very hard, firm, very sticky and very plastic; no roots; few very fine irregular pores and few very fine tubular pores; continuous moderately thick clay films as bridges; clay nearly fills pores; most of the cobblestones are sandstone and are quite rotten; slightly acid (pH 6.1).

The A horizon ranges from grayish brown through brown and dark grayish brown in hues of 10YR and 7.5YR. This horizon is typically very fine sandy loam in texture but in places is loam. It ranges from 12 to 20 inches in thickness. Generally there is an A3 or a B1 horizon. The Bt horizon ranges from reddish brown through yellowish red in hue of 5YR. This horizon ranges from clay loam to sandy clay loam in texture. It is slightly acid to neutral. The IIB3 horizon ranges from light reddish brown through reddish brown and from light brown or brown through strong brown in hues of 5YR and 7.5YR. This horizon ranges from clay to clay loam in texture and in most places is 50 to 75 percent cobblestones or gravel. A few cobblestones occur throughout the solum. The B horizon becomes extremely hard if exposed to air.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai stony very fine sandy loam, 2 to 15 percent slopes, eroded; and Ojai very fine sandy loam, 2 to 9 percent slopes, eroded.

Permeability is moderately slow. Surface runoff is slow, and the erosion hazard is slight. The fine-textured subsoil does not restrict root development. The available water holding capacity is about 5.5 to 7.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for avocados, citrus crops, and dryland grain, and for urban development. A small acreage is used for range. Capability unit IIs-1.

Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded (OsD2).--This is a gently sloping to strongly sloping soil of the old terraces. In contrast with Ojai very fine sandy loam, 0 to 2 percent slopes (OhA), this soil has steeper slopes, is moderately eroded, and has a 6- to 16-inch surface layer that is 15 to 35 percent stones, cobblestones, and gravel.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded; Ojai very fine sandy loam; Sespe clay loam; and Soper loam.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is about 5 to 6.5 inches in the 60 inches of effective rooting depth.

This soil is used primarily for citrus crops and avocados. A small acreage is used for urban development and for range. Capability unit IVe-7.

Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded (OsE2).--This is a moderately steep soil of the old terraces. In contrast with Ojai very fine sandy loam, 0 to 2 percent slopes (OhA), this soil has steeper slopes, is eroded, has a 6- to 16-inch surface layer, and is about 25 to 35 percent gravel, cobblestones, and stones.

Included with this soil in mapping were areas of Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded; Lodo rocky loam; Sespe clay loam; Soper loam; and soils that have slopes of less than 15 percent, have lost more than 75 percent of the original surface layer through erosion, and contain a few deep gullies.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity has been reduced by erosion and by the stones and cobblestones. About 4 to 6 inches of moisture is available in the 60 inches of effective rooting depth.

This soil is used primarily for citrus crops, for urban development, and for range. Capability unit VIe-7.

Ojai very fine sandy loam, 2 to 9 percent slopes, eroded (OhC2).--This is a gently sloping to moderately sloping soil of the old terraces. In contrast with Ojai very fine sandy loam, 0 to 2 percent slopes (OhA), this soil has steeper slopes and is moderately eroded. It has lost as much as one-fourth of the original surface layer, or contains numerous gullies, or both. The present surface layer is 9 to 15 inches thick.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai very fine sandy loam, 0 to 2 percent slopes; and Ojai very fine sandy loam, 9 to 15 percent slopes, eroded.

Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is 5 to 7 inches in the 60 inches of effective rooting depth.

This soil is used for citrus crops, avocados, and dryland grain, for urban development, and for range. Capability unit IIIe-1.

Ojai very fine sandy loam, 9 to 15 percent slopes, eroded (OhD2).--This is a strongly sloping soil of the old terraces. In contrast with Ojai very fine sandy loam, 0 to 2 percent slopes (OhA), this soil has steeper slopes and is moderately eroded. It has lost as much as one-fourth of the original surface layer, or contains numerous gullies, or both. The present surface layer is 9 to 15 inches thick.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded; Ojai very fine sandy loam, 2 to 9 percent slopes, eroded; Sespe clay loam; and Soper loam.

Surface runoff is medium, and the erosion hazard is moderate. The available water holding capacity is 5 to 7 inches in the 60 inches of effective rooting depth.

This soil is used for citrus crops, avocados, and dryland grain, for urban development, and for range. Capability unit IVe-1.

Pacheco Series

The Pacheco series consists of poorly drained silty clay loams 60 inches or more deep. These soils soils formed in basins or on alluvial plains, in stratified alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 2 percent. Elevations range from 25 to 100 feet. The annual rainfall ranges from 14 to 16 inches, and the frost-free season from 300 to 330 days. The average annual air temperature is 60° F. The vegetation is salt-tolerant grasses, forbs, and shrubs.

Pacheco soils occur with Anacapa, Camarillo, Cropley calcareous variant, and Hueneme soils. They are used for vegetables and lemons, for field crops, and for urban development.

Pacheco silty clay loam (Pa).--This is a nearly level soil of the basins and alluvial plains.

The surface layer is dark-gray, mildly alkaline to strongly alkaline silty clay loam about 17 inches thick. This layer is calcareous in the lower part. Below this is light brownish-gray, mottled, calcareous silty clay loam about 29 inches thick. At a depth of about 46 inches is pale-yellow, calcareous, stratified silt and sand.

Representative profile located about 250 feet south and 100 feet west of intersection of Pleasant Valley Road and Wood Road (2 miles west of the town of Camarillo).

Ap1--0 to 3 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; weak, fine, subangular blocky and moderate, medium, granular structure; hard, firm, sticky and slightly plastic; many fine, many very fine, and very few medium and coarse roots; few very fine, fine, and medium tubular pores; mildly alkaline (pH 7.8); abrupt, smooth boundary.

Ap2--3 to 11 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; weak, coarse, prismatic and strong, medium, subangular blocky structure; extremely hard, extremely firm, sticky and plastic; common very fine, common fine, and very few coarse roots; common very fine, common fine, and few medium tubular pores; moderately alkaline (pH 8.0); gradual, smooth boundary.

A1--11 to 17 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; weak, coarse, prismatic structure; extremely hard, extremely firm, sticky and plastic; few very fine, fine, and coarse roots; few very fine and very few fine tubular pores; strongly alkaline (pH 8.5) and effervescent; lime disseminated; many irregular white (2.5Y 8/0) gypsum segregations; gradual, irregular boundary.

C1g--17 to 22 inches, light brownish-gray (2.5Y 6/2) light silty clay loam, dark grayish brown (2.5Y 4/2) moist; many fine mottles; weak, coarse, prismatic structure; very hard, very firm, sticky and plastic; few very fine, fine, and coarse roots; many very fine and common fine closed tubular pores; strongly alkaline (pH 8.5) and strongly effervescent; lime disseminated; many irregular gypsum segregations; gradual, smooth boundary.

C2--22 to 46 inches, light brownish-gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2)

moist; massive; extremely hard, extremely firm, sticky and plastic; few very fine, fine, and coarse roots; many very fine and common fine closed tubular pores; strongly alkaline (pH 8.5) and strongly effervescent; lime disseminated; few irregular gypsum segregations; gradual, wavy boundary.

IIC3--46 to 67 inches, pale-brown (5Y 7/3) stratified silts and sands, olive (5Y 5/3) moist; strong, fine, platy (layered) structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine irregular pores; strongly alkaline (pH 8.5) and violently effervescent; lime disseminated.

The A horizon ranges from gray through dark gray in hues of 10YR and 2.5Y. This horizon ranges from silty clay loam to clay loam in texture and from 12 to 18 inches in thickness. It is mildly alkaline to strongly alkaline and is intermittently calcareous. The C horizon ranges from light gray and brownish gray through grayish brown and pale yellow in hues of 2.5Y and 5Y. This horizon ranges from silty clay loam to clay loam in texture; it is 18 to 35 percent clay and more than 15 percent sand. In places below a depth of 40 inches, this horizon is highly stratified and the texture ranges from sand to light clay. It contains faint mottles within a depth of 20 to 30 inches. In most places it contains gypsum masses. The C horizon is moderately alkaline to strongly alkaline and is strongly calcareous.

Included with this soil in mapping were areas of Camarillo loam; Cropley clay, calcareous variant; and Hueneme sandy loam.

Unless adequately protected, this soil is subject to infrequent flooding. Unless artificially drained, it has a seasonal water table within a depth of 24 to 36 inches and periodically contains soluble salts. Permeability is moderately slow. Surface runoff is very slow, and there is no erosion hazard. The available water holding capacity is about 9 to 11 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for vegetables and lemons, for field crops, and for urban development. Capability unit IIw-2.

Pico Series

The Pico series consists of well-drained and somewhat excessively drained, calcareous sandy loams and loams 60 inches or more deep. These soils formed on alluvial fans and plains, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 800 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from 300 to 350 days. The average annual air temperature is 62° F. The vegetation is annual grasses, forbs, and scattered brush.

Pico soils occur with Anacapa, Corralitos, Cortina, Metz, and Mocho soils. They are used for vegetables, citrus crops, field crops, and walnuts, for urban development, and for range.

Pico sandy loam, 0 to 2 percent slopes (PcA).--This is a nearly level to level soil of the alluvial plains and fans.

The surface layer is grayish-brown, calcareous sandy loam about 14 inches thick. Below this is light brownish-gray, calcareous loam and sandy loam. At a depth of 54 inches is very pale brown gravelly coarse sand.

Representative profile located about 1,400 feet north and 900 feet east of SE. corner of sec. 34, T. 3 N., R. 19 W., SBB&M.

Ap--0 to 4 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak, fine, granular structure; slightly hard, very friable, nonsticky and nonplastic; many micro and few very fine roots; many micro irregular pores; moderately alkaline (pH 8.0) and very slightly effervescent; disseminated lime; abrupt, wavy boundary.

A12--4 to 14 inches, grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few micro and very few fine roots; common micro tubular pores; moderately alkaline (pH 8.0) and very slightly effervescent; disseminated lime; very abrupt, wavy boundary.

C1--14 to 17 inches, light brownish-gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few micro roots; common micro tubular pores; moderately alkaline (pH 8.0) and violently effervescent; disseminated lime; very abrupt, broken boundary.

C2--17 to 28 inches, light brownish-gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few micro roots; common micro tubular pores; moderately alkaline (pH 8.0) and slightly effervescent; disseminated lime; gradual, smooth boundary.

C3--28 to 54 inches, light brownish-gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few micro roots; common micro tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated in filaments; abrupt, smooth boundary.

IIC4--54 to 60 inches, very pale brown (10YR 7/3) gravelly coarse sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; few micro roots; many micro irregular pores; moderately alkaline (pH 8.0) and strongly effervescent; disseminated lime.

The A horizon ranges from grayish brown through dark grayish brown and brown in hues of 10YR and 2.5Y and values of 4 and 5. This horizon ranges from sandy loam through fine sandy loam and light loam in texture, is 5 to 10 percent gravel 2 to 5 millimeters in size, and ranges from 10 to 19 inches in thickness. It is moderately alkaline and is typically calcareous; in places the uppermost few inches is noncalcareous.

The C horizon is pale brown, very pale brown, or light brownish gray in hues of 10YR and 2.5Y, values of 6 and 7, and chromas of 2 and 3. This horizon is sandy loam or loam in texture and in places is stratified below a depth of 40 inches with unrelated horizons that are as much as 30 percent gravel.

Included with this soil in mapping were small areas of Anacapa sandy loam; Corralitos loamy sand; Cortina stony sandy loam; Metz loamy sand; Mocho loam; and Pico loam, sandy substratum.

Drainage is good. Permeability is moderately rapid. Surface runoff is slow, and there is no erosion hazard. The available water holding capacity is about 5 to 7.5 inches in the 60 inches of effective rooting depth. Natural fertility is medium.

This soil is used for vegetables, citrus crops, field crops, and walnuts, for urban development, and for range. Capability unit IIs-4.

Pico sandy loam, 2 to 9 percent slopes (PcC).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Pico sandy loam, 0 to 2 percent slopes (PcA), mainly in having steeper slopes.

Included with this soil in mapping were areas of Anacapa sandy loam; Corralitos loamy sand; Garretson loam; Metz loamy fine sand; and Pico sandy loam, 0 to 2 percent slopes.

Surface runoff is slow to medium, and the erosion hazard is slight.

This soil is used for citrus crops, field crops, and walnuts, for urban development, and for range. The gentle slopes are used for vegetables. Capability unit IIe-1.

Pico loam, sandy substratum, 0 to 2 percent slopes (PsA).--This is a nearly level to level soil of the alluvial plains and fans. It differs from Pico sandy loam, 0 to 2 percent slopes (PcA), mainly in having a surface layer of loam and a layer of gravelly and stony coarse sand at a depth of 24 to 36 inches.

Included with this soil in mapping were small areas of Anacapa sandy loam, Metz loamy sand, Pico sandy loam, and Sorrento loam.

Drainage is somewhat excessive. Permeability is rapid. Surface runoff is very slow, and there is no erosion hazard. The available water holding capacity is about 3.5 to 5.5 inches in the 24 to 36 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for vegetables, field crops, and citrus crops, and for range. Capability unit IIIs-0.

Pits and Dumps

Pits and dumps (PxG) consists of sand and gravel pits, refuse dumps, waste areas, rock quarries, and other areas related to mining operations. Sand and gravel pits generally occur with the coarse alluvial soils or those formed on soft sedimentary formations. Dumps and waste areas do not occur with any particular soil type. Rock quarries typically occur with igneous rock or hard sedimentary rock formations.

The natural drainage, subsoil permeability, available water holding capacity, runoff, erosion hazard, and effective rooting depth all vary. Inherent fertility is low.

These areas are typically barren and have little value for farming. If filled and covered with topsoil, they make good parks and recreational areas. Capability unit VIIIs-1.

Rincon Series

The Rincon series consists of well-drained silty clay loams that have a sandy clay subsoil. These soils developed on old alluvial fans and terraces, in material weathered from sedimentary rocks. They have slopes of 2 to 30 percent. Elevations range from 100 to 1,500 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 280 to 330 days. The average annual air temperature is 60° F. The vegetation is annual grasses, forbs, and brush.

Rincon soils occur with Azule, Chesterton, Cropley, Huerhuero, and San Benito soils. They are used primarily for citrus crops and field crops, for urban development, and for range. Vegetables are grown on the more gentle slopes.

Rincon silty clay loam, 2 to 9 percent slopes (RcC).--This is a gently sloping to moderately sloping soil of the old alluvial fans and terraces.

The surface layer is dark-gray, slightly acid silty clay loam about 16 inches thick. The subsoil is dark grayish-brown and brown, neutral to moderately alkaline sandy clay and sandy clay loam about 24 inches thick. This layer is calcareous in the lower part. At a depth of about 40 inches is stratified, yellowish-brown, calcareous sandy clay loam and sandy loam.

Representative profile located 7,400 feet south and 4,200 feet east of SW. corner of sec. 25, T. 3 N., R. 21 W., SBB&M.

A11--0 to 4 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; moderate, medium, granular structure; hard, firm, sticky and plastic; many very fine and few medium roots; common very fine and micro tubular pores; slightly acid (pH 6.5); clear, wavy boundary.

A12--4 to 16 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; massive; very hard, firm, sticky and plastic; many very fine and few medium roots; common very fine, few fine, and very few medium tubular pores; slightly acid (pH 6.5); gradual, wavy boundary.

B21t--16 to 25 inches, dark grayish-brown (10YR 4/2) sandy clay, very dark grayish brown (10YR 3/2) moist; weak, coarse, prismatic structure; extremely hard, very firm, sticky and very plastic; many very fine roots; common micro,

common very fine, and very few fine and medium tubular pores; many thin clay films on ped faces, and common moderately thick clay films in pores; neutral (pH 7.0); gradual, smooth boundary.

B22t--25 to 31 inches, dark grayish-brown (10YR 4/2) sandy clay with brown (10YR 5/3) mottles or splotches, very dark grayish brown (10YR 3/2) with dark-brown (10YR 4/3) mottles moist; moderate, medium, angular blocky structure; very hard, very firm, sticky and plastic; few micro and very fine roots; common micro, common very fine, and few fine and medium tubular pores; common thin clay films on ped faces and in pores; moderately alkaline (pH 7.8) and slightly effervescent; lime segregated in filaments; gradual, smooth boundary.

B3tca--31 to 40 inches, brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; weak, medium, angular blocky structure; very hard, firm, sticky and plastic; few micro and very fine roots; very few fine and micro tubular pores; few thin clay films on ped faces and in pores; moderately alkaline (pH 8.0) and strongly effervescent; lime segregated into soft masses and filaments; gradual, irregular boundary.

Cca -40 to 60 inches, yellowish-brown (10YR 5/4), stratified sandy clay loam and sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, sticky and plastic; few micro and very fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated into filaments.

The A horizon is dark grayish brown, dark gray, very dark gray, or very dark grayish brown in hue of 10YR. This horizon is typically silty clay loam in texture but in places is clay loam or sandy clay loam. It ranges from 15 to 32 inches in thickness. It is slightly acid to neutral. The B2t horizon ranges from light brownish gray through dark grayish brown and from pale brown through brown or light yellowish brown and yellowish brown in hue of 10YR, values of 4, 5, and 6, and chromas of 2, 3, and 4. This horizon is sandy clay or silty clay in texture, has moderately thick to thin clay films on ped faces and in pores, and ranges from 13 to 34 inches in thickness. The C horizon ranges from light brownish gray through grayish brown and from pale brown through brown or yellowish brown. This horizon ranges from sandy clay loam to sandy loam in texture. It is mildly alkaline to moderately alkaline and is intermittently calcareous.

Included with this soil in mapping were areas of Azule loam; Chesterton coarse sandy loam; Cropley clay; Huerhuero very fine sandy loam; Rincon silty clay loam, 9 to 15 percent slopes, eroded; and soils that have slopes of 0 to 2 percent.

Permeability is slow. Surface runoff is medium, and the erosion hazard is slight to moderate. The subsoil does not restrict root development. The available water holding capacity is about 8.5 to 10.5 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for citrus crops, field crops, and vegetables, for urban development, and for range. Capability unit IIe-3.

Rincon silty clay loam, 9 to 15 percent slopes, eroded (RcD2).--This is a strongly sloping soil of the terraces. In contrast with Rincon silty clay loam, 2 to 9 percent slopes (RcC), this soil has steeper slopes, shows evidence of sheet and rill erosion, has a few gullies, and has a 12- to 24-inch surface layer and a less strongly developed subsoil.

Included with this soil in mapping were areas of Azule loam; Chesterton coarse sandy loam; Huerhuero very fine sandy loam; San Benito clay loam; Rincon silty clay loam, 2 to 9 percent slopes; and Rincon silty clay loam, 15 to 30 percent slopes, eroded.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used primarily for citrus crops and field crops, for urban development, and for range. Capability unit IIIe-3.

Rincon silty clay loam, 15 to 30 percent slopes, eroded (RcE2).--This is a moderately steep soil of the terraces. In contrast with Rincon silty clay loam, 2 to 9 percent slopes (RcC), this soil has steeper slopes; is moderately eroded; shows evidence of sheet, rill, and gully erosion; and has a less strongly developed subsoil, which is at a depth of 10 to 20 inches.

Included with this soil in mapping were areas of Azule loam; Huerhero very fine sandy loam; San Benito clay loam; Soper loam; and Rincon silty clay loam, 9 to 30 percent slopes, severely eroded.

Runoff is medium to rapid, and the erosion hazard is moderate to severe.

This soil is used primarily for citrus crops and dryland grain, for urban development, for range, and for watershed. Capability unit IVe-3.

Rincon silty clay loam, 9 to 30 percent slopes, severely eroded (RcE3).--This is a moderately steep soil of the terraces. It differs from Rincon silty clay loam, 2 to 9 percent slopes (RcC), mainly in having steeper slopes and a greater degree of erosion. About 75 percent of the orginal surface layer has been removed by sheet erosion, and there are numerous deep gullies. The surface layer is less than 16 inches thick, and in many places the subsoil is exposed.

Included with this soil in mapping were areas of Azule loam; Huerhuero very fine sandy loam; San Benito clay loam; Soper loam; and Rincon silty clay loam, 15 to 30 percent slopes, eroded.

Runoff is medium to rapid, and the erosion hazard is severe. Natural fertility is medium.

This soil is used primarily for range and for watershed. Capability unit VIe-3.

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Riverwash

Riverwash (Rw) occurs in and along channels of perennial and intermittent streams. The material is 60 inches deep. It consists of highly stratified, water-deposited layers of stony and gravelly sand that contain relatively small amounts of silt and clay. This land type is frequently inundated during and immediately following storms. It is subject to scouring or cutting as well as to deposition, depending on streamflow and bedload. Riverwash is essentially barren. The scant vegetation consists of willows, brush, and related plants.

Included with this land type in mapping were areas of Corralitos loamy sand, Cortina stony sandy loam, Metz loamy sand, and Sandy alluvial land.

Drainage is excessive. Permeability is very rapid. Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is 2 to 3.5 inches in the 60-inch depth. Inherent fertility is low.

This land type has no value for farming. It is used for watershed. Capability unit VIIIw-4.

Salinas Series

The Salinas series consists of well-drained clay loams 60 inches or more deep. These soils formed on alluvial fans and plains, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 1,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 300 to 350 days. The average annual air temperature is 60° F. The vegetation is annual grasses and forbs.

Salinas soils occur with Cropley, Cropley calcareous variant, Garretson, Mocho, Pacheco, and Sorrento soils. They are used for vegetables, field crops, citrus crops, and walnuts, for urban development, and for range.

Salinas clay loam, 0 to 2 percent slopes (SaA).--This is a nearly level or level soil of the alluvial fans and alluvial plains.

The surface layer is dark-gray, neutral clay loam about 26 inches thick. Below this is dark-gray through yellowish-brown and light yellowish-brown, calcareous clay loam and silt loam. This material extends to a depth of more than 60 inches.

Representative profile located about 2,000 feet south and 300 feet east of intersection of Somis Road (Highway 34) and Los Angeles Avenue (Highway 118), in the hamlet of Somis.

A11--0 to 3 inches, dark-gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; strong, medium, granular structure; hard, firm, sticky and plastic; few very fine and fine tubular pores; neutral (pH 6.7); abrupt, smooth boundary.

A12--3 to 16 inches, dark-gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; moderate, medium, subangular blocky structure; very hard, very firm, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; neutral (pH 7.0); gradual, wavy boundary.

A13--16 to 26 inches, dark-gray (10YR 4/1) clay loam, very dark grayish brown (10YR 3/2) moist; moderate, medium, subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; neutral (pH 7.2); gradual, wavy boundary.

AC--26 to 31 inches, dark-gray and dark grayish-brown (10YR 4/1 & 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, coarse, subangular blocky structure; very hard, very firm, sticky and plastic; common very fine and fine tubular pores; mildly alkaline (pH 7.8) and very slightly effervescent; lime disseminated; clear, wavy boundary.

C1ca--31 to 45 inches, yellowish-brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; massive; hard, very firm, sticky and plastic; common fine and very fine roots; common very fine and fine tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated in a few fine filaments; gradual, irregular boundary.

C2ca--45 to 60 inches, light yellowish-brown (10YR 6/4) silt loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, sticky and slightly plastic; very few very fine and fine roots; many very fine irregular pores and many very fine tubular pores; moderately alkaline (pH 8.2) and violently effervescent; lime disseminated and in filaments.

The A horizon ranges from gray through very dark gray in hue of 10YR. This horizon is typically clay loam in texture but in places is silty clay loam. It ranges from 20 to 36 inches in thickness. It is neutral to mildly alkaline and is noncalcareous. The C horizon is light yellowish brown, yellowish brown, or brown in hue of 10YR and light yellowish brown or light olive brown in hue of 2.5Y. This horizon ranges from clay loam to silty clay in texture and is 18 to 35 percent clay. It is mildly alkaline to moderately alkaline and is calcareous. In places the lower part of the C horizon is stratified with silt loam and sandy loam.

Included with this soil in mapping were small areas of Cropley clay; Cropley clay, calcareous variant; Garretson loam; Mocho clay loam; Pacheco silty clay loam; Salinas clay loam, 2 to 9 percent slopes; and Sorrento silty clay loam.

Permeability is moderately slow. Surface runoff is slow, and there is no erosion hazard. The available water holding capacity is about 9.5 to 11 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for vegetables, field crops, citrus crops, and walnuts, for urban development, and for range. Capability unit I-1.

Profile of Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded, showing silica-cemented hardpan below subsoil.

Profile of San Benito clay loam, 15 to 30 percent slopes, eroded. Large acreages of this upland soil are used for citrus crops, avocados, and range.

Displaced retaining wall on highly expansive Cropley clay.

Salinas clay loam, 2 to 9 percent slopes (SaC).--This is a gently sloping to moderately sloping soil of the alluvial fans and alluvial plains. It differs from Salinas clay loam, 0 to 2 percent slopes (SaA), mainly in having steeper slopes and in places having stratified materials below a depth of 40 inches that average sandy loam in texture.

Included with this soil in mapping were areas of Cropley clay; Cropley clay, calcareous variant; Garretson loam; Mocho clay loam; Salinas clay loam, 0 to 2 percent slopes; and Sorrento silty clay loam.

Runoff is medium, and the erosion hazard is slight.

This soil is used primarily for field crops, citrus crops, and walnuts, for urban development, and for range. The more gentle slopes are used for vegetables. Capability unit IIe-1.

San Andreas Series

The San Andreas series consists of well-drained sandy loams 60 inches deep over soft sandstone and loose sandy and gravelly deposits. These soils formed in upland areas and have slopes of 30 to 50 percent. Elevations range from 400 to 2,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 260 to 300 days. The average annual air temperature is 60° F. The vegetation is annual grasses and forbs, brush, and scattered oaks.

San Andreas soils occur with Arnold, Calleguas, Gaviota, and Saugus soils. They are used primarily for range and for watershed.

San Andreas sandy loam, 30 to 50 percent slopes (SbF).--This is a steep soil of the uplands.

The surface layer is dark grayish-brown and brown, slightly acid and medium acid sandy loam about 20 inches thick. The subsoil is brown, medium acid and strongly acid heavy sandy loam about 17 inches thick. At a depth of about 37 inches is light yellowish-brown, strongly acid loamy coarse sand.

Representative profile located about 1,700 feet west and 1,350 feet south of NE. corner of sec. 16, T. 3 N., R. 19 W., SBB&M.

A11--0 to 4 inches, dark grayish-brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, friable, nonsticky and nonplastic; many fine and very fine roots; many very fine irregular pores; slightly acid (pH 6.5); abrupt, smooth boundary.

A12--4 to 12 inches, dark grayish-brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, friable, nonsticky and nonplastic; many fine and very fine roots; many very fine irregular pores; slightly acid (pH 6.5); abrupt, smooth boundary.

A3--12 to 20 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular pores and common fine and very fine tubular pores; medium acid (pH 6.0); gradual, smooth boundary.

B21- 20 to 29 inches, brown (10YR 5/3) heavy sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine irregular pores and common very fine and fine tubular pores; very few thin clay films in pores; medium acid (pH 5.8); gradual, irregular boundary.

B22--29 to 37 inches, brown (10YR 5/3) heavy sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine, few fine, and very few medium roots; many very fine irregular pores and common very fine and fine tubular pores; few thin clay films in pores and as bridges; strongly acid (pH 5.5); gradual, wavy boundary.

C--37 to 60 inches, light yellowish-brown (10YR 6/4) loamy coarse sand; yellowish brown (10YR 5/4) moist; massive; soft, friable, nonsticky and nonplastic; very few very fine, fine, and medium roots; many very fine irregular pores and common very fine and fine tubular pores; few thin clay films in pores and as bridges in uppermost few inches; strongly acid (pH 5.5).

The A horizon ranges from grayish brown through dark grayish brown in hue of 10YR. This horizon is typically sandy loam but in places is coarse sandy loam or fine sandy loam. It ranges from 10 to 20 inches in thickness. It is neutral to medium acid. The B horizon is grayish brown or brown in hue of 10YR. It ranges from 12 to 20 inches in thickness. It is slightly acid to strongly acid. The C horizon consists of sandy or gravelly sediments and soft sandstone. It is easily penetrated by roots and water. In places the profile is 35 percent gravel.

Included with this soil in mapping were areas of Arnold sand; Badland; Calleguas-Arnold complex; Gaviota rocky sandy loam; Saugus sandy loam; and soils that have slopes of less than 30 percent or more than 50 percent.

Permeability is moderate. Runoff is rapid, and the erosion hazard is severe. The available water holding capacity is 4.5 to 7 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used primarily for range and for watershed. Capability unit VIIe-1.

San Benito Series

The San Benito series consists of well-drained clay loams 40 to 60 inches deep over softly consolidated sediments. These soils formed in upland areas and have slopes of 9 to 75 percent. Elevations range from 250 to 2,000 feet. The annual rainfall ranges from 14 to 18 inches, and the frost-free season from 260 to 280 days. The average annual air temperature is 62° F. The vegetation is annual grasses and brush.

San Benito soils occur with Diablo, Huerhuero, Linne, Los Osos, Nacimiento, and Soper soils. They are used primarily for citrus crops and avocados, for range, and for watershed. The more gentle slopes are used for field crops and for urban development.

San Benito clay loam, 15 to 30 percent slopes, eroded (ScE2).--This is a moderately steep and hilly soil of the uplands.

The surface layer is dark grayish-brown, moderately alkaline clay loam about 25 inches thick. Below this is grayish-brown and light yellowish-brown, calcareous clay loam about 35 inches thick (see pl. I).

Representative profile located about 150 feet NE. of intersection of Berylwood and Bradley Roads, on Bradley Road, 2 miles north of Somis.

Ap--0 to 6 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong, medium, granular structure; hard, friable, sticky and plastic; common micro roots; many micro irregular pores; moderately alkaline (pH 8.0); abrupt, smooth boundary.

A12--6 to 15 inches, dark grayish-brown (10YR 4/2) clay loam, very dark gray (10YR 3/1) moist; moderate, medium and coarse, subangular blocky structure; hard, friable, sticky and plastic; very few fine roots; many micro tubular pores; moderately alkaline (pH 8.0); common pressure faces and a few thin clay films; clear, wavy boundary.

A13- 15 to 25 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, coarse, subangular blocky structure; hard, friable, sticky and plastic; very few fine roots; many micro tubular pores; moderately alkaline (pH 8.0); a little gravel that is strongly effervescent; gradual, wavy boundary.

C1ca--25 to 35 inches, grayish-brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak, coarse, subangular blocky structure; hard, friable, sticky and plastic; very few very fine roots; many micro tubular pores; moderately alkaline (pH 8.0) and strongly effervescent; lime disseminated and segregated in filaments; gradual, wavy boundary.

C2ca--35 to 60 inches, light yellowish-brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; weak, medium, subangular blocky structure; slightly hard, friable, sticky and plastic; very few micro roots; many micro tubular pores; moderately alkaline (pH 8.0) and violently effervescent; lime disseminated and segregated in seams.

The A horizon ranges from dark grayish brown through grayish brown and dark brown and brown in hues of 10YR and 2.5Y. This horizon ranges from heavy loam to clay loam and sandy clay loam in texture and from 20 to 30 inches in thickness. It ranges from neutral to moderately alkaline and in places is calcareous in the lower part. The C horizon ranges from grayish brown and light brownish gray through light yellowish brown in hues of 10YR and 2.5Y. This horizon ranges from heavy loam to clay loam and sandy clay loam in texture. Depth to the softly consolidated sediments, sandstone, or shale ranges from 48 to 60 inches.

Included with this soil in mapping were small areas of Diablo clay; Nacimiento silty clay loam; Rincon silty clay loam; and San Benito clay loam, 30 to 50 percent slopes, eroded; and, in Canada Larga, north of the city of Ventura and on the west side of Lake Piru, scattered areas of an unnamed, neutral to slightly acid silty clay or clay that is 2 to 4 feet deep over fractured, noncalcareous shale.

Permeability is moderately slow. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 8.5 to 10.5 inches in the 48 to 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used mainly for citrus crops and avocados, for range, and for watershed. Capability unit IVe-1.

San Benito clay loam, 9 to 15 percent slopes, eroded (ScD2).--This is a strongly sloping or rolling soil of the uplands. It differs from San Benito clay loam, 15 to 30 percent slopes, eroded (ScE2), mainly in having more gentle slopes.

Included with this soil in mapping were small areas of Azule loam; Diablo clay; Los Osos clay loam; and Rincon silty clay loam; and, east of Point Mugu in the Santa Monica Mountains, two areas totaling 50 acres, of an unnamed, neutral to slightly acid silty clay or clay that is 2 to 4 feet deep over fractured, noncalcareous shale.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used mainly for citrus crops, avocados, and field crops, for urban development, and for range. Capability unit IIIe-1.

San Benito clay loam, 30 to 50 percent slopes, eroded (ScF2).--This is a steep soil of the uplands. It differs from San Benito clay loam, 15 to 30 percent slopes, eroded (ScE2), mainly in having steeper slopes.

Included with this soil in mapping were areas of Castaic soils; Diablo clay; and Los Osos clay loam; and a few small areas of an unnamed, neutral to slightly acid silty clay or clay that is 2 to 4 feet deep over fractured, noncalcareous shale.

Surface runoff is rapid, and the erosion hazard is severe.

This soil is used mainly for range and for watershed. Capability unit VIe-1.

San Benito clay loam, 50 to 75 percent slopes (ScG).--This is a very steep soil of the uplands. It differs from San Benito clay loam, 15 to 30 percent slopes, eroded (ScE2), mainly in having steeper slopes. The depth to consolidated sediments, sandstone, or shale is 45 to 60 inches.

Included with this soil in mapping were areas of Badland; Castaic and Saugus soils; Gazos silty clay loam; Nacimiento silty clay loam; and San Benito silty clay loam, 30 to 50 percent slopes, eroded.

Surface runoff is very rapid, and the erosion hazard is very severe. The available water holding capacity is 8 to 10.5 inches in the 45 to 60 inches of effective rooting depth.

This soil is used mainly for range and for watershed. Capability unit VIIe-1.

Sandy Alluvial Land

Sandy alluvial land (Sd) consists of stratified sandy sediments, gravelly and cobbly in places, on flood plains adjacent to perennial and intermittent streams. This land type is subject to infrequent flooding, scouring, or deposition immediately following high-intensity storms of long duration. The vegetation consists of annual grasses, brush, willows, and scattered cottonwood trees.

Included with this land type in mapping were areas of Corralitos loamy sand, Cortina stony sandy loam, Metz loamy sand, and Riverwash.

Drainage is excessive. Permeability is very rapid. Surface runoff is slow, and the erosion hazard is slight. The available water holding capacity is 4 to 5 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This land type has little value for range. Protected areas have been used for citrus fruits. Capability unit IVw-4.

Santa Lucia Series

The Santa Lucia series consists of well-drained shaly silty clay loams 20 to 36 inches deep over fractured, diatomaceous shale. These soils formed in upland areas and have slopes of 15 to 75 percent. Elevations range from 250 to 2,500 feet. The annual rainfall ranges from 14 to 22 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 60° F. The vegetation is annual grasses and brush.

Santa Lucia soils occur with Calleguas, Gazos, Linne, and Nacimiento soils. They are used primarily for range and for watershed. The less steep slopes are used for citrus crops and for urban development.

Santa Lucia shaly silty clay loam, 15 to 30 percent slopes (SeE).--This is a moderately steep soil of the uplands.

The surface layer is dark-gray and gray, medium acid shaly silty clay loam about 23 inches thick. Below this is gray, medium acid very shaly silty clay loam about 10 inches thick. At a depth of about 33 inches is fractured, diatomaceous shale.

Representative profile located about 1,000 feet south and 1,400 feet west of NE. corner of sec. 7, T. 3 N., R. 24 W., SBB&M.

A11--0 to 6 inches, dark-gray (10YR 4/1) shaly silty clay loam, black (10YR 2/1) moist; moderate, fine, subangular blocky structure; hard, firm, sticky and plastic; many very fine and few fine roots; few fine tubular pores; medium acid (pH 6.0); about 10 to 20 percent shale fragments; gradual, smooth boundary.

A12--6 to 13 inches, dark-gray (10YR 4/1) shaly heavy silty clay loam, very dark gray (10YR 3/1) moist; moderate, fine, subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; medium acid (pH 6.0); about 20 to 40 percent shale fragments; gradual, wavy boundary.

A13--13 to 23 inches, gray (10YR 5/1) very shaly heavy silty clay loam, very dark gray (10YR 3/1) moist; moderate, medium, subangular blocky structure; very hard, firm, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; medium acid (pH 6.0); about 40 to 60 percent shale fragments; gradual, wavy boundary.

C--23 to 33 inches, gray (10YR 5/1) very shaly heavy silty clay loam, dark gray (10YR 4/1) moist; massive; hard, firm, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; medium acid (pH 6.0); about 40 to 75 percent shale fragments; gradual, smooth boundary.

R--33 inches, fractured, diatomaceous shale; about 10 to 25 percent of this layer is soil material in cracks and fractures.

The A horizon is gray or dark gray in hue of 10YR. This horizon is shaly or very shaly silty clay loam to shaly or very shaly silty clay in texture and ranges from 20 to 26 inches in thickness. It is slightly acid to medium acid. Where present, the C horizon is gray or grayish brown in hue of 10YR. It ranges from very shaly silty clay loam to very shaly silty clay in texture and is more than 35 percent clay. It ranges from 0 to 10 inches in thickness. It is slightly acid to medium acid. The percentage of shale exceeds 15 in the upper part of the A horizon and 50 in the lower part of the A horizon and in the C horizon. Depth to fractured, diatomaceous shale ranges from 20 to 36 inches.

Included with this soil in mapping were areas of Calleguas shaly loam; Gazos silty clay loam; Linne silty clay loam; Nacimiento silty clay loam; a soil similar to the Santa Lucia soil but less than 20 inches deep; and soils that have a grayish-brown or dark grayish-brown surface layer.

Permeability is moderate. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 2.5 to 5 inches in the 20 to 36 inches of effective rooting depth. Inherent fertility is medium.

This soil is used mainly for urban development, for range, for watershed, and for citrus crops. Capability unit IVe-1.

Santa Lucia shaly silty clay loam, 30 to 50 percent slopes (SeF).--This is a steep soil of the uplands. It differs from Santa Lucia shaly silty clay

loam, 15 to 30 percent slopes (SeE), mainly in having steeper slopes. The surface layer is 20 to 24 inches thick, and the depth to shale is 20 to 32 inches.

Included with this soil in mapping were areas of Calleguas shaly loam; Gazos silty clay loam; Linne silty clay loam; and a soil similar to the Santa Lucia soil but less than 20 inches thick.

Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 2.5 to 4.5 inches in the 20 to 32 inches of effective rooting depth.

This soil is used mainly for range and for watershed. Capability unit VIe-1.

Santa Lucia shaly silty clay loam, 50 to 75 percent slopes (SeG).--This is a very steep soil of the uplands. It differs from Santa Lucia shaly silty clay loam, 15 to 30 percent slopes (SeE), mainly in having steeper slopes. The surface layer is 20 to 24 inches thick, and the depth to shale is about 20 to 32 inches.

Included with this soil in mapping were areas of Badland; Castaic-Balcom complex; Gazos silty clay loam; Nacimiento silty clay loam; Santa Lucia shaly silty clay loam, 30 to 50 percent slopes; and a soil similar to the Santa Lucia soil but less than 20 inches thick.

Runoff is very rapid, and the erosion hazard is very severe. The available water holding capacity is about 2.5 to 4.5 inches in the 20 to 32 inches of effective rooting depth.

This soil is used mainly for watershed and for range. Capability unit VIIe-1.

Saugus Series

The Saugus series consists of well-drained sandy loams 48 to 60 inches deep over soft, noncalcareous sandstone or shale. These soils formed in upland areas and have slopes of 5 to 50 percent. Elevations range from 600 to 2,500 feet. The annual rainfall ranges from 15 to 19 inches, and the frost-free season from 250 to 275 days. The average annual air temperature is 60° F. The vegetation is brush and annual grasses.

Saugus soils occur with Arnold, Balcom, Castaic, Gaviota, and San Andreas soils. They are used primarily for range and for watershed. Field crops are grown on the more gentle slopes.

Saugus sandy loam, 30 to 50 percent slopes, eroded (ShF2).--This is a steep soil of the mountainous uplands.

The surface layer is brown and yellowish-brown, neutral and slightly acid sandy loam about 17 inches thick. The next layer is light yellowish-brown, slightly acid sandy loam about 32 inches thick. At a depth of about 49 inches is firm, pale-brown, slightly acid sandstone that crushes easily to sandy loam.

Representative profile located about 3,100 feet north and 300 feet east of SW. corner of sec. 5, T. 3 N., R. 19 W., SBB&M.

A11--0 to 5 inches, brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak, fine, granular structure; soft, very friable, nonsticky and nonplastic; many micro and few very fine roots; many micro irregular pores; neutral (pH 7.0); clear, smooth boundary.

A12--5 to 17 inches, yellowish-brown (10YR 5/4) sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common micro and few fine and very fine roots; common very fine and very few fine tubular pores; slightly acid (pH 6.5); gradual, wavy boundary.

C1--17 to 49 inches, light yellowish-brown (10YR 6/4) sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few micro and very few very fine roots; very few fine and very fine tubular pores; slightly acid (pH 6.5); gradual, irregular boundary.

C2--49 to 60 inches, pale-brown (10YR 6/3) firm sandstone crushing easily to sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common micro tubular pores; slightly acid (pH 6.5).

The A horizon ranges from light brownish gray and grayish brown through pale brown and brown to yellowish brown in hues of 10YR. This horizon ranges from sandy loam to loam in texture; it is less than 18 percent clay. It ranges from 9 to 30 inches in thickness. The C horizon ranges from light brownish gray and grayish brown through brown, pale brown, light yellowish brown, and yellowish brown. Weak rock structure is evident in the lower part of the C horizon, but the material is only a little more firm than the overlying soil and crushes easily to sandy loam. The profile ranges from slightly acid to mildly alkaline. Total depth ranges from 48 to 60 inches. In areas where this soil formed in material weathered from sandstone, the color is typically in hue of 10YR and the texture is sandy loam. In areas where it formed in material weathered from shale, the color is typically in hue of 2.5Y and the texture is loam. In these areas the lower part of the C horizon contains gypsum crystals.

Included with this soil in mapping were areas of Badland, areas of Castaic and Saugus soils, and areas of Gaviota and San Andreas soils; and a similar but unnamed soil, in the Aliso Canyon and Grimes Canyon areas, that is calcareous throughout.

Permeability is moderate. Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 5 to 6 inches in the 48 to 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used mainly for range and for watershed. Capability unit VIIe-1.

Saugus sandy loam, 5 to 30 percent slopes (ShE).--This is a moderately sloping to moderately steep soil of the uplands. It differs from Saugus sandy loam, 30 to 50 percent slopes, eroded (ShF2), mainly in having more gentle slopes.

Included with this soil in mapping were areas of Badland, areas of Castaic and Saugus soils, and areas of Gaviota and San Andreas soils.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is 5 to 5 inches in the 48 to 60 inches of effective rooting depth.

This soil is used mainly for range and for watershed. A small acreage is used for avocados. Capability unit VIe-1.

Sedimentary Rock Land

Sedimentary rock land (SnG) consists of steep and very steep mountainous areas of sandstone and shale covered with a thin mantle of relatively stable soil material. This land type is more than 25 percent rock outcrop. It produces only a small amount of silt and debris, but where shale is predominant, the rocks are unstable and tend to slide or slip. Sedimentary rock land is typically nearly barren or has only sparse brush cover.

Included with this land type in mapping were areas of Badland and of Balcom, Castaic, Gaviota, and Saugus soils.

Drainage is excessive. Permeability is moderate. Surface runoff is very rapid, and the erosion hazard is severe. The available water holding capacity and the effective rooting depth vary. Inherent fertility is low.

This land type has no value for farming and is used for watershed. Capability unit VIIIs-1.

Sespe Series

The Sespe series consists of well-drained clay loams that have a sandy clay subsoil and are 24 to 48 inches deep over hard sandstone and shale. These soils formed in mountainous upland areas and have slopes of 15 to 75 percent. Elevations range from 400 to 2,600 feet. The annual rainfall ranges from 18 to 22 inches, and the frost-free season from 250 to 280 days. The average annual air temperature is 61° F. The vegetation is annual grasses, brush, and scattered oaks.

Sespe soils occur with Kimball, Lodo, and Ojai soils and Sedimentary rock land. They are used primarily for watershed and for range. The less steep slopes are used for citrus crops and for urban development.

Sespe clay loam, 50 to 75 percent slopes (SoG).--This is a very steep soil of the mountainous uplands.

The surface layer is brown, medium acid clay loam about 18 inches thick. The subsoil is reddish-brown, slightly acid sandy clay about 22 inches thick. At a depth of about 40 inches is hard sandstone.

Representative profile located approximately 3,900 feet east and 2,640 feet south of building on observation point on Casitas Dam.

A1--0 to 12 inches, brown (7.5YR 5/2) clay loam, dark brown (7.5YR 3/2) moist; moderate, medium, subangular blocky structure; hard, firm, sticky and plastic; many very fine, many fine, and common medium and coarse roots; common very fine tubular pores; medium acid (pH 6.0); clear, wavy boundary.

A3--12 to 18 inches, brown (7.5YR 5/2) heavy clay loam, dark brown (7.5YR 3/2) moist; moderate, fine, subangular blocky structure; very hard, very firm, sticky and plastic; many very fine, many fine, and few medium and coarse roots; common very fine tubular pores; medium acid (pH 6.0); gradual, irregular boundary.

B1t--18 to 26 inches, reddish-brown (5YR 4/3) light sandy clay, dark reddish brown (5YR 3/3) moist; moderate, medium, subangular blocky structure; very hard, very firm, sticky and plastic; common very fine, common fine, and few medium and coarse roots; common very fine and fine tubular pores; common moderately thick clay films on ped faces and in pores; slightly acid (pH 6.2); gradual, wavy boundary.

B2t--26 to 40 inches, reddish-brown (5YR 4/3) sandy clay, dark reddish brown (5YR 3/3) moist; strong, medium, subangular blocky structure; very hard, very firm, sticky and plastic; common very fine, common fine, and few medium and coarse roots; common very fine, common fine, and few medium tubular pores; common moderately thick clay films on ped faces and many moderately thick clay films in pores; slightly acid (pH 6.5); clear, wavy boundary.

R--40 inches, brownish-yellow, hard and firm sandstone, slightly acid (pH 6.5).

In places there is a thin O1 horizon of dead grasses and leaves. The A horizon is brown or reddish brown in hues of 7.5YR and 5YR. It is heavy loam or clay loam in texture and ranges from 14 to 20 inches in thickness. It is neutral to medium acid. In places there is a transitional horizon, an A3, or a B1, or both, between the A and B horizons. The B2t horizon is reddish in hues of 7.5YR, 5YR, or 2.5YR. This horizon is heavy clay loam, light clay, or sandy clay in texture and is a little more than 35 percent clay. It ranges from 10 to 20 inches in thickness. It is slightly acid to neutral. The R horizon is typically hard sandstone or shale. Its depth ranges from 24 to 40 inches. In places it has lime coatings in the upper joints.

Included with this soil in mapping were areas of Lodo rocky loam; Sedimentary rock land; Sespe clay loam; and a soil similar to the Sespe soil but more than 45 inches deep.

Permeability is slow. Surface runoff is very rapid, and the erosion hazard is very severe. The available water holding capacity is 4 to 7 inches in the 24 to 40 inches of effective rooting depth.

Inherent fertility is medium.

This soil is used primarily for watershed and for range. Capability unit VIIe-1.

Sespe clay loam, 15 to 30 percent slopes, eroded (SoE2).--This is a moderately steep soil of the mountainous uplands. In contrast with Sespe clay loam, 50 to 75 percent slopes (SoG), it has less steep slopes, is moderately eroded, has a 20- to 30-inch surface layer, and is 30 to 48 inches deep over bedrock.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai stony fine sandy loam; and Sespe clay loam, 30 to 50 percent slopes.

Runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is 5 to 8 inches in the 30 to 48 inches of effective rooting depth.

This soil is used primarily for citrus crops, for urban development, for range, and for watershed. Capability unit IVe-1.

Sespe clay loam, 30 to 50 percent slopes (SoF).--This is a steep soil of the mountainous uplands. In contrast with Sespe clay loam, 50 to 75 percent slopes (SoG), it has less steep slopes, is moderately eroded, has an 18- to 26-inch surface layer, and is 28 to 40 inches deep over bedrock.

Included with this soil in mapping were areas of Lodo rocky loam; Sedimentary rock land; Sespe clay loam, 15 to 30 percent slopes, eroded; and Sespe clay loam, 50 to 75 percent slopes.

Runoff is rapid, and the erosion hazard is severe. The available water holding capacity is 4.5 to 7 inches in the 28 to 40 inches of effective rooting depth.

This soil is used primarily for range and for watershed. Capability unit VIe-1.

Soper Series

The Soper series consists of well-drained loams or gravelly loams that have a subsoil of very gravelly sandy clay loam and are 24 to 58 inches deep over weakly cemented sand, gravel, and stones. These soils formed in upland areas, in weakly consolidated conglomerate or sandstone. They have slopes of 15 to 50 percent. Elevations range from 100 to 2,000 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 61° F. The vegetation is annual grasses, forbs, and scattered brush.

Soper soils occur with Arnold, Los Osos, Ojai, and San Benito soils. They are used primarily for avocados, for urban development, for range, and for watershed.

Soper gravelly loam, 30 to 50 percent slopes, eroded (SvF2).--This is a steep soil of the uplands.

The surface layer is grayish-brown and dark grayish-brown, slightly acid gravelly loam about 11 inches thick. The subsoil is brown, dark-brown, and strong-brown, neutral to medium acid very gravelly sandy clay loam and gravelly clay loam about 46 inches thick. At a depth of about 57 inches is weakly cemented conglomerate.

Representative profile located 1,000 feet east and 2,300 feet south of NW. corner of sec. 35, T. 3 N., R. 19 W., SBB&M.

A11--0 to 5 inches, grayish-brown (10YR 5/2) gravelly loam, dark grayish brown to very dark grayish brown (10YR 4/2-3/2) moist; weak, fine, granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine, many very fine, and few medium roots; many very fine irregular pores and many fine tubular pores; slightly acid (pH 6.1); abrupt, smooth boundary. About 10 to 15 percent gravel.

A12--5 to 11 inches, dark grayish-brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate, medium, subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine and common fine tubular pores; slightly acid (pH 6.5); gradual, smooth boundary. About 10 to 15 percent gravel.

B1t--11 to 17 inches, dark-brown (7.5YR 4/4) very gravelly sandy clay loam, dark brown (7.5YR 3/4) moist; moderate, medium, subangular blocky structure; very hard, firm, sticky and slightly plastic; common fine and very fine roots; many very fine and common fine tubular pores; few thin clay films in pores; neutral (pH 6.7); gradual, smooth boundary. About 50 percent stones and gravel.

B21t--17 to 30 inches, brown (7.5YR 5/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; moderate, medium, subangular blocky structure; very hard, firm, sticky and plastic; few medium, fine, and very fine roots; many very fine and common fine tubular pores; common moderately thick clay films in pores; few thin clay films on ped faces; neutral (pH 6.8); gradual, wavy boundary. About 50 percent stones and gravel.

B22t--30 to 42 inches, brown (7.5YR 5/4) gravelly clay loam, dark brown (7.5YR 4/4) moist; strong, medium, subangular blocky structure; very hard, firm, sticky and plastic; few very fine and very few fine roots; common very fine and few fine tubular pores; common moderately thick clay films on ped faces; neutral (pH 6.6); gradual, wavy boundary. About 30 percent stones and gravel.

B3--42 to 57 inches, strong-brown (7.5YR 5/6) gravelly sandy clay loam, strong brown (7.5YR 4/6) moist; weak, coarse, prismatic structure; extremely hard, very firm, sticky and plastic; few very fine and very few fine roots; few thick clay films on ped faces and in pores; medium acid (pH 6.0); abrupt, smooth boundary.

About 30 percent stones and gravel.
IIC--57 inches, weakly cemented sand, gravel, and stones.

The A horizon ranges from grayish brown through dark grayish brown in hue of 10YR. This horizon is typically loam in texture but in places is fine sandy loam or clay loam. It is 10 to 25 percent gravel and is 8 to 12 inches thick. The Bt horizon is dark brown or reddish brown, brown, strong brown, or yellowish red in hues of 7.5YR or 5YR. This horizon ranges from sandy clay loam to clay loam in texture, is 30 to 50 percent gravel, and ranges from 32 to 46 inches in thickness. It is medium acid to mildly alkaline. The C horizon consists of weakly consolidated conglomerate and sandstone. Depth to this horizon ranges from 40 to 58 inches. The Soper soils in this Area have more gravel and stones in the Bt horizon than the Soper soils mapped elsewhere in California.

Included with this soil in mapping were areas of Arnold sand; Badland; Los Osos clay loam; San Benito clay loam; soils that have slopes of more than 50 percent; and soils that lack a Bt horizon.

Permeability is moderately slow. Surface runoff is rapid, and the erosion hazard is severe. The available water holding capacity is about 4.5 to 6.5 inches in the 40 to 58 inches of rooting depth. Inherent fertility is medium.

This soil is used primarily for range and for watershed. Capability unit VIIe-1.

Soper loam, 15 to 30 percent slopes, eroded (SsE2).--This is a moderately steep or hilly soil of the uplands. In contrast with Soper gravelly loam, 30 to 50 percent slopes, eroded (SvF2), this soil is not gravelly in the surface layer, is 15 to 35 percent gravel throughout the rest of the profile, tends to have a greater clay increase in the subsoil, and has more gentle slopes. It is 24 to 58 inches deep over conglomerate.

Included with this soil in mapping were areas of Los Osos clay loam; Ojai stony fine sandy loam; Rincon silty clay loam; San Benito clay loam; and Soper gravelly loam, 30 to 50 percent slopes, eroded.

Surface runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 4 to 7.5 inches in the 24 to 58 inches of rooting depth.

This soil is used primarily for avocados, for urban development, for range, and for watershed. Capability unit VIe-1.

Sorrento Series

The Sorrento series consists of well-drained loams and silty clay loams 60 inches or more deep. These soils formed on alluvial fans and plains, in alluvium derived from sedimentary rocks. They have slopes of 0 to 9 percent. Elevations range from 25 to 1,700 feet. The annual rainfall ranges from 14 to 20 inches, and the frost-free season from 300 to 350 days. The average annual air temperature is 60° F. The vegetation is annual grasses, forbs, and scattered oaks.

Sorrento soils occur with Anacapa, Garretson, Mocho, and Salinas soils. They are used for vegetables, field crops, citrus crops, avocados, and walnuts, for urban development, and for range.

Sorrento loam, 0 to 2 percent slopes (SwA).--This is a nearly level soil of the alluvial fans and plains.

The surface layer is grayish-brown, neutral and mildly alkaline loam and heavy loam about 19 inches thick. Below this is grayish-brown and light brownish-gray, moderately alkaline heavy loam that becomes calcareous with increasing depth.

Representative profile located about 1.5 miles east of Somis on Highway 118, north 1,600 feet, east 100 feet.

Ap--0 to 5 inches, grayish-brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; moderate, medium, granular structure; hard, friable, slightly sticky and slightly plastic; very few micro roots; many micro and very fine tubular pores; neutral (pH 7.0); clear, smooth boundary.
A12--5 to 19 inches, grayish-brown (2.5Y 5/2) heavy loam, very dark grayish brown (2.5Y 3/2) moist; weak, medium, subangular blocky structure; hard, firm, sticky and slightly plastic; common medium roots; common micro, common very fine, and few medium tubular pores; mildly alkaline (pH 7.5); gradual, smooth boundary.
C1--19 to 38 inches, grayish-brown (2.5Y 5/2) heavy loam, dark grayish brown (2.5Y 4/2) moist; weak, medium, subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common medium roots; common micro and few medium tubular pores; moderately alkaline (pH 8.0); gradual, wavy boundary.
C2ca--38 to 60 inches, light brownish-gray (10YR 6/2) heavy loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; common medium and very few very fine roots; common micro tubular pores; moderately alkaline (pH 8.2) and slightly effervescent; lime disseminated and segregated in fine filaments.

The A horizon is grayish brown or dark grayish brown in hues of 10YR and 2.5Y. This horizon is typically loam in texture but in places is sandy loam. It ranges from 10 to 19 inches in thickness. It is slightly acid to moderately alkaline and is noncalcareous. The C horizon is light brownish gray and grayish brown in hues of 10YR and 2.5Y, brown or yellowish brown in hue of 10YR, or light olive brown in hue of 2.5Y. This horizon ranges from heavy loam to light clay loam in texture; it is 18 to 35 percent clay.

Included with this soil in mapping were areas of Anacapa sandy loam; Garretson loam; Mocho loam; Pico sandy loam; and Sorrento loam, 2 to 9 percent slopes.

Permeability is moderate. Surface runoff is slow, and there is no erosion hazard. The available water holding capacity is about 8 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for vegetables, field crops, citrus crops, avocados, and walnuts. It is also used for urban development and to a small extent for range. Capability unit I-1.

Sorrento loam, 2 to 9 percent slopes (SwC).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Sorrento loam, 0 to 2 percent slopes (SwA), mainly in having steeper slopes.

Included with this soil in mapping were small areas of Anacapa sandy loam; Garretson loam; Mocho loam; Pico sandy loam; and Sorrento loam, 0 to 2 percent slopes.

Surface runoff is medium, and the erosion hazard is slight.

This soil is used primarily for citrus crops, avocados, field crops, and walnuts, and for urban development. The more gentle slopes are used for vegetables. Capability unit IIe-1.

Sorrento silty clay loam, 0 to 2 percent slopes (SxA).--This is a nearly level or level soil of the alluvial plains and fans. It differs from Sorrento loam, 0 to 2 percent slopes (SwA), mainly in having silty clay loam texture and less stratification throughout the profile. The lower part of the C horizon is likely to be coarse textured if this soil occurs near a stream. The depth to lime is generally 24 to 43 inches.

Included with this soil in mapping were small areas of Cropley clay; Garretson silt loam, calcareous variant; Mocho clay loam; Salinas clay loam; and Sorrento silty clay loam, 2 to 9 percent slopes.

Permeability is moderately slow. The available water holding capacity is about 9 to 11 inches in the 60 inches of effective rooting depth.

This soil is used primarily for vegetables, field crops, citrus crops, and walnuts, for urban development, and to a small extent for range. Capability unit I-1.

Sorrento silty clay loam, 2 to 9 percent slopes (SxC).--This is a gently sloping to moderately sloping soil of the alluvial fans. It differs from Sorrento loam, 0 to 2 percent slopes (SwA), mainly in having silty clay loam texture throughout the profile and steeper slopes. The depth to lime is about 30 inches.

Included with this soil in mapping were small areas of Cropley clay; Garretson silt loam, calcareous variant; Mocho clay loam; Salinas clay loam; and Sorrento silty clay loam, 0 to 2 percent slopes.

Permeability is moderately slow. Surface runoff is medium, and the erosion hazard is slight. The available water holding capacity is about 9 to 11 inches in the 60 inches of effective rooting depth.

This soil is used primarily for citrus crops, field crops, and walnuts, and for urban development. The more gentle slopes are used for vegetables. Capability unit IIe-1.

Sorrento Series, Heavy Variant

The Sorrento series, heavy variant, consists of well-drained clay loams 60 or more inches deep. These soils formed on alluvial fans, in alluvium derived predominantly from sedimentary rocks. They have slopes of 2 to 15 percent. Elevations range from 25 to 1,200 feet. The annual rainfall ranges from 18 to 21 inches, and the frost-free season from 250 to 300 days. The average annual air temperature is 61° F. The vegetation is oaks and annual grasses and some scattered brush.

Sorrento soils, heavy variant, occur with Kimball, Lodo, Ojai, Sespe, and Soper soils. They are used mainly for citrus crops, avocados, and field crops, for urban development, and for range.

Sorrento clay loam, heavy variant, 2 to 9 percent slopes (SzC).--This is a gently sloping to moderately sloping soil of the alluvial fans.

The surface layer is dark grayish-brown, slightly acid clay loam about 14 inches thick. The next layer is dark grayish-brown, neutral heavy clay loam about 16 inches thick. At a depth of 30 inches is brown, moderately alkaline heavy clay loam. This material extends to a depth of more than 60 inches.

Representative profile located 6,400 feet south and 700 feet west of SW. corner of sec. 35, T. 4 N., R. 23 W., SBB&M.

A1--0 to 14 inches, dark grayish-brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; strong, fine, granular structure; very hard, firm, sticky and plastic; common micro roots; many very fine irregular pores; slightly acid (pH 6.5); clear, smooth boundary.

AC--14 to 30 inches, dark grayish-brown (10YR 4/2) heavy clay loam, very dark grayish brown (10YR 3/2) moist; massive; very hard, firm, sticky and plastic; very few micro and fine roots; common micro and very fine tubular pores; few thin clay films in some pores; neutral (pH 7.0); diffuse, wavy boundary.

C--30 to 60 inches, brown (7.5YR 4/2) heavy clay loam, dark brown (7.5YR 3/2) moist; massive; very hard, firm, sticky and plastic; very few micro roots; very few micro tubular pores; moderately alkaline (pH 8.0).

The A and AC horizons are grayish brown and dark grayish brown through brown and dark brown in hues of 10YR and 7.5YR and values of 4 and 5. These horizons range from clay loam to sandy clay loam in texture and from 20 to 34 inches in thickness. The C horizon ranges from brown through dark brown or

reddish gray and dark reddish gray through reddish brown in hues of 7.5YR and 5YR. This horizon ranges from heavy clay loam to light clay in texture and, below a depth of 40 inches, to sandy loam and sandy clay loam. It is mildly to moderately alkaline. It is typically noncalcareous, but in a few places the lower part is calcareous. If thoroughly dry, this soil has cracks 1/2 inch wide to a depth of 20 inches.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai very fine sandy loam; and Sorrento clay loam, heavy variant, 9 to 15 percent slopes.

Permeability is slow. Surface runoff is medium, and the erosion hazard is slight. The available water holding capacity is 9.5 to 11.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used mainly for citrus crops, avocados, and field crops, for urban development, and for range. Capability unit IIe-1.

Sorrento clay loam, heavy variant, 9 to 15 percent slopes (SzD).--This is a strongly sloping soil of the alluvial fans. It differs from Sorrento clay loam, heavy variant, 2 to 9 percent slopes (SzC), mainly in having steeper slopes.

Included with this soil in mapping were areas of Kimball sandy loam; Ojai very fine sandy loam; and Sorrento clay loam, heavy variant, 2 to 9 percent slopes.

The erosion hazard is moderate.

This soil is used primarily for citrus crops, avocados, and field crops, for urban development, and for range. Capability unit IIIe-1.

Terrace Escarpments

Terrace escarpments (TeF) consist of steep, relatively smooth descending slopes at the ends of terraces. Typically the soil material varies considerably in characteristics within short distances. Under natural conditions, there is a good vegetative cover of annual grasses and shrubs. Terrace escarpments too small or narrow to delineate are shown by a special symbol on the soil map.

This land type occurs with Azule, Chesterton, Huerhuero, Kimball, Ojai, and Rincon soils.

The natural drainage, subsoil permeability, available water holding capacity, and effective rooting depth all vary. Surface runoff is rapid, and the erosion hazard is severe. Inherent fertility is medium.

This land type is used primarily for range and for watershed. Some citrus and avocado plantings have been established. Capability unit VIIe-1.

Tidal Flats

Tidal flats (Ts) are nearly level coastal areas that are periodically covered by tidal water. Most are covered only at unusually high tide; some of the lower lying areas are covered daily. Typically this land type is highly stratified with thin layers of very fine sandy loam, silt loam, clay loam, and clay that, if mixed, are clay loam in texture. It is very saline, and the natural vegetation is salt- and water-tolerant grasses.

Included with this land type in mapping were small areas of Coastal beaches and Riverwash.

Drainage is very poor. The water table is high, and subsoil permeability is moderately slow. Surface runoff is ponded, and there is no erosion hazard. The available water holding capacity and the effective rooting depth vary. Inherent fertility is medium.

This land type has no value for farming. It is either idle or used for wildlife. Capability unit VIIIw-6.

Vina Series

The Vina series consists of well-drained loams, gravelly loams, or silty clay loams 60 or more inches deep. These soils formed on alluvial fans and plains, in alluvium derived from basic igneous rocks. They have slopes of 0 to 9 percent. Elevations range from 100 to 1,000 feet. The annual rainfall ranges from 15 to 20 inches, and the frost-free season from 300 to 350 days. The average annual air temperature is 61° F. The vegetation is annual grasses and scattered oaks.

Vina soils occur with Cibo, Cropley, Gilroy, and Hambright soils. They are used for field crops, vegetables, and citrus crops, for urban development, and for range.

Vina loam, 2 to 9 percent slopes (VaC).--This is a gently sloping to moderately sloping soil of the alluvial fans.

The surface layer is grayish-brown and dark grayish-brown, neutral loam about 18 inches thick. Below this is dark grayish-brown and grayish-brown, neutral and slightly acid loam and very fine sandy loam. This material extends to a depth of more than 60 inches.

Representative profile located in Long Grade Canyon about 1.7 miles east of Camarillo State Hospital, 100 feet north of Potrero Road.

Ap--0 to 6 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak, fine and medium, granular structure; slightly hard, friable, slightly sticky and plastic; many micro and very fine roots; common micro and very fine tubular pores; neutral (pH 7.0); clear, wavy boundary.

A12--6 to 18 inches, dark grayish-brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak, medium, granular structure; hard, friable, slightly sticky and plastic; many micro and very fine roots; common micro and

very fine tubular pores; neutral (pH 7.0); clear, smooth boundary.

C1--18 to 33 inches, dark grayish-brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and plastic; many micro, many very fine, and very few fine roots; few micro and very fine tubular pores; neutral (pH 7.0); gradual, wavy boundary.

IIC--33 to 60 inches, grayish-brown (10YR 5/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; many micro and very few coarse roots; common micro, common very fine, and very few fine and medium tubular pores; slightly acid (pH 6.5).

The surface is about 15 percent gravel and cobblestones. The profile is 5 to 10 percent gravel 2 to 5 millimeters in size. The A horizon is grayish brown and dark grayish brown through brown and dark brown in hues of 10YR and 7.5YR. This horizon is typically loam but ranges to light clay loam. It ranges from 6 to 19 inches in thickness. It is slightly acid to mildly alkaline. The C horizon is grayish brown and dark grayish brown through brown, dark brown, and yellowish brown in hues of 10YR and 7.5YR. This horizon is typically sandy loam to clay loam; in places it is gravelly. It ranges from slightly acid to moderately alkaline. In places the lower part is calcareous. The organic-matter content is more than 1/2 percent throughout the profile.

Included with this soil in mapping were small areas of Cibo clay, Cropley clay, and Vina gravelly loam.

Permeability is moderate. Surface runoff is slow to medium, and the erosion hazard is slight to moderate. The available water holding capacity is about 7.5 to 9.5 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for vegetables, field crops, and citrus crops, for urban development, and for range. Capability unit IIe-1.

Vina loam, 0 to 2 percent slopes (VaA).--This is a level to nearly level soil of the alluvial plains or fans. It differs from Vina loam, 2 to 9 percent slopes (VaC), mainly in having more gentle slopes.

Included with this soil in mapping were areas of Cropley clay; Vina loam, 2 to 9 percent slopes; and Vina gravelly loam, 2 to 9 percent slopes.

Runoff is very slow, and there is no erosion hazard.

This soil is used for field crops, vegetables, and citrus crops, for urban development, and for range. Capability unit I-1.

Vina gravelly loam, 2 to 9 percent slopes (VnC).--This is a gently sloping to moderately sloping soil of the alluvial fans. In contrast with Vina loam, 2 to 9 percent slopes (VaC), this soil is 15 to 25 percent gravel, 2 to 10 millimeters in size, throughout the profile, and the surface layer ranges to gravelly clay loam in texture.

Included with this soil in mapping were areas of Cibo clay, Cropley clay, Vina loam, Vina silty clay loam, and an unnamed soil that is more than 25 percent gravel.

The available water holding capacity is about 6 to 8.5 inches in the 60 inches of effective rooting depth.

This soil is used mainly for citrus crops, for urban development, and for range. To a limited extent it is used for field crops. Capability unit IIe-1.

Vina silty clay loam, 2 to 9 percent slopes (VsC).--This is a gently sloping to moderately sloping soil of the alluvial fans. In contrast with Vina loam, 2 to 9 percent slopes (VaC), this soil has a silty clay loam texture throughout and tends to be weakly calcareous in the lower part of the C horizon.

Included with this soil in mapping were small areas of Cibo clay, Cropley clay, Vina loam, and Vina gravelly loam.

Permeability is moderately slow. Surface runoff is medium, and the erosion hazard is slight to moderate. The available water-holding capacity is 10 to 11.5 inches in the 60 inches of effective rooting depth.

This soil is used mainly for citrus crops and field crops, for urban development, and for range. Capability unit IIe-1.

Zamora Series

The Zamora series consists of well-drained loams that have a clay loam subsoil. These soils formed on alluvial fans and benches, in alluvium derived predominantly from sedimentary rocks. They have slopes of 2 to 15 percent. Elevations range from 25 to 1,000 feet. The annual rainfall ranges from 14 to 16 inches, and the frost-free season from 300 to 330 days. The average annual air temperature is 60° F. The vegetation is annual grasses and forbs.

Zamora soils occur with Azule, Garretson, Rincon, and Sorrento soils. They are used for citrus crops, vegetables, and field crops, for urban development, and for range.

Zamora loam, 2 to 9 percent slopes (ZmC).--This is a gently sloping to moderately sloping soil of the alluvial fans.

The surface layer is dark grayish-brown and brown, slightly acid and neutral loam about 17 inches thick. The subsoil is brown, neutral clay loam about 23 inches thick. It is underlain by pale-brown, mildly alkaline sandy loam that extends to a depth of more than 60 inches.

Representative profile located about 1,700 feet north and 2,400 feet west of SE. corner

of sec. 6, T. 2 N., R. 18 W., SBB&M.

Ap1--0 to 5 inches, dark grayish-brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate, medium, granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, common very fine, and few medium roots; many very fine irregular pores and many fine and very fine tubular pores; slightly acid (pH 6.5); clear, smooth boundary.

Ap2--5 to 11 inches, dark grayish-brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, firm, sticky and slightly plastic; common fine, common very fine, and few medium roots; many very fine irregular pores and common very fine and few fine tubular pores; neutral (pH 6.7); gradual, smooth boundary.

A3--11 to 17 inches, brown (10YR 5/3) heavy loam, dark brown (10YR 4/3) moist; massive; hard, firm, sticky and slightly plastic; many fine, many very fine, and very few medium roots; many very fine, many fine, and very few medium roots; many very fine irregular pores and common very fine and few fine tubular pores; neutral (pH 6.7); gradual, wavy boundary.

B1t--17 to 24 inches, brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate, fine, subangular blocky structure; hard, firm, sticky and plastic; common fine and very fine roots; few fine and very fine tubular pores; few thin clay films on ped faces and common thin clay films in pores; neutral (pH 7.0); gradual, smooth boundary.

B2t--24 to 40 inches, brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate, medium, subangular blocky structure; hard, firm, sticky and plastic; few fine and common very fine roots; few fine and very fine tubular pores; few thin clay films on ped faces and common moderately thick clay films in pores; neutral (pH 7.0); gradual, smooth boundary.

C--40 to 52 inches, pale-brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine irregular pores; few thin clay films as collodial stains on sand grains; mildly alkaline (pH 7.5).

The A horizon is dark grayish brown, grayish brown, or brown in hue of 10YR. This horizon is typically loam in texture but in places is fine sandy loam or light clay loam. It ranges from 12 to 18 inches in thickness. The B horizon is dark grayish brown through brown and pale brown in hue of 10YR. This horizon ranges from heavy loam to clay loam in texture and from 23 to 45 inches in thickness. The C horizon, if present, ranges from pale brown through brown and yellowish brown or light olive brown in hues of 10YR and 2.5Y. This horizon ranges from sandy loam to light clay loam in texture and in places contains gravel or cobblestones or both. It is mildly alkaline to moderately alkaline and in places is calcareous.

Included with this soil in mapping were areas of Azule loam; Garretson loam; Rincon silty clay loam; Sorrento loam; and Zamora loam, 9 to 15 percent slopes, eroded. Also included were about 400 acres of an unnamed soil near Hall Road and Toland Road in the Santa Clara River Valley. This included soil is 35 to 50 percent gravel and cobblestones. Its surface layer is loam, and its subsoil gravelly sandy clay loam.

Permeability is moderately slow. Surface runoff is slow to medium, and the erosion hazard is slight. The available water holding capacity is 7.5 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for citrus crops and field crops, for urban development, and for range. Vegetables are grown on the milder slopes. Capability unit IIe-1.

Zamora loam, 9 to 15 percent slopes, eroded (ZmD2).--This is a strongly sloping soil of the alluvial fans and benches. It differs from Zamora loam, 2 to 9 percent slopes (ZmC), mainly in having steeper slopes and showing evidence of moderate sheet erosion.

Included with this soil in mapping were areas of Azule loam; Rincon silty clay loam; and Zamora loam, 2 to 9 percent slopes. Also included were about 250 acres of an unnamed soil near Toland Road and the mouth of Timber Canyon in the Santa Clara River Valley. This included soil is 35 to 50 percent gravel and cobblestones. Its surface layer is gravelly loam. Its subsoil is gravelly sandy clay loam and contains only a few thin, patchy clay films.

Surface runoff is medium, and the erosion hazard is moderate.

This soil is used for citrus crops and field crops, for urban development, and for range. Capability unit IIIe-1.

USE OF THE SOILS IN ENGINEERING 2/

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. Among the properties most important to engineers are strength, permeability, compaction characteristics, shrink-swell behavior, water-holding capacity, grain size, plasticity, and soil reaction. Topography, the depth to the water table, the depth to bedrock, and stratification within the profile also are important.

Information concerning these and related soil properties is furnished in tables 2 and 3. The estimates and interpretations in these tables can be used to--

1. Make preliminary estimates of the engineering properties of soils in planning drainage systems, farm ponds, irrigation systems, and other structures for conserving soil and water.
2. Make studies that will aid in selecting and developing industrial, commercial, residential, and recreational sites.
3. Locate probable sources of sand and gravel and other construction material.
4. Locate probable sources of borrow material for road fill and for the construction of dams, levees, dikes, and other embankments.
5. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
6. Develop other preliminary estimates for construction purposes.
7. Supplement other publications, such as maps, reports, and aerial photographs, that are used in preparation of engineering reports for a specific area.
8. Correlate performance with soil mapping units to develop information that will be useful in planning engineering practices and in designing and maintaining engineering structures.

The engineering interpretations reported here do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or excavations deeper than the depths reported (ordinarily about 5 feet). Even in these situations, however, the soil map is useful in planning more detailed field investigations and in indicating the kinds of problems that may be expected.

Some of the terms used by soil scientists have special meanings in soil science that may not be familiar to engineers. These terms are defined in the Glossary.

Engineering Classification

The two systems most commonly used in classifying soils for engineering are the systems approved by the American Association of State Highway Officials (AASHO) and the Unified system.

The AASHO system (1) is used to classify soils according to those properties that affect use in highway construction. In this system all soil material is classified in seven principal groups. The groups range from A-1, which consists of soils that have the highest bearing strength and are the best soils for subgrade, to A-7, which consists of soils that have the lowest strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. The numbers range from 0, for the best material, to 20, for the poorest. The group index number is shown in parentheses following the soil group symbol (see table 2).

In the Unified system (12) soils are identified according to particle-size distribution, plasticity, and liquid limit. GP and GW are clean gravels, and GM and GC are gravels that include, respectively, an appreciable amount of nonplastic and plastic fines. SP and SW are clean sands. SM and SC are sands that include fines of silt and clay. ML and CL are silts and clays that have a low liquid limit, and MH and CH are silts and clays that have a high liquid limit. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML-CL.

Soil scientists use the USDA textural classification (10). In this, the texture of the soil is determined according to the proportion of soil particles smaller than 2 millimeters in diameter, that is, the proportion of sand, silt, and clay. Textural modifiers, such as gravelly, stony, shaly, and cobbly, are used as needed.

Table 2 shows the AASHO and Unified classification of specified soils in the Area, as determined by laboratory tests. Table 3 shows the estimated classification of all the soils in the Area according to all three systems of classification.

Physical and Chemical Test Data

Samples of selected layers taken from representative soil profiles in the Ventura Area were tested in the laboratory of District VII, California State Division of Highways. Results of these tests are given in table 2.

The moisture-density relations, that is, the maximum dry density and the optimum moisture content, were determined by (1) the California Division of Highways Test Number 216 and (2) the American Society for Testing Materials (ASTM) Test Designation D-1557, modified to three layers. If soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The moisture content at which the maximum dry density is obtained is the optimum moisture content.

2/ Michael S. Simmons, Area engineer, Soil Conservation Service.

Mechanical analysis of the selected samples was determined by the sieve and hydrometer methods, California Division of Highways Test Numbers 202 and 203. The size and proportions of soil particles affect the behavior of soil material when it is used for engineering purposes.

The tests for liquid limit, plastic limit, and plasticity index measure the effect of water on consistence of the soil material. Determinations were made by the California Division of Highways Test Number 204. As the moisture content of a clayey soil increases from a dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the soil material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range in moisture content within which a soil material is in a plastic condition.

The capacity of the soil to expand was determined by two test procedures. The procedure to determine the coefficient of linear extensibility was performed on undisturbed, unconfined (except by moisture tension) samples. This procedure determines the vertical component of volume change in a soil upon drying from a moisture tension of 1/3 atmosphere to oven dryness. The procedure to determine the percentage of expansion was performed on a confined soil sample subjected to a load of 60 pounds per square foot and submerged in water. The total amount of expansion was recorded after a 24-hour period. The data on the coefficient of linear extensibility are useful in working with soil in a natural condition, and those on percent expansion are helpful in working with compacted soil fills.

The resistivity of selected soil samples was determined by the Ventura County Department of Public Works, using California test method 643-B "Method for Estimating the Service Life of Metal Culverts". Electrical resistance of a soil is a factor bearing on the probable rate of corrosion; a low resistance indicates rapid corrosion and a high resistance indicates a reduced rate of corrosion. Corrosion, as used here, indicates the potential danger to uncoated metal or to concrete structures through chemical action that dissolves or weakens the structural material. Structural material may corrode when buried in soil, and any given material corrodes more rapidly in some soils than in others. Extensive installations that intersect soil boundaries or soil horizons are more likely to be damaged by corrosion than are installations that are entirely in one kind of soil or one soil horizon.

The reaction, or pH value, is a numerical means for designating acidity and alkalinity. The reaction of selected soils was determined by the Ventura County Department of Public Works, using an electrical pH meter in accordance with California test method 643-B.

Also shown in table 2 are the results of sulfate determinations made on selected soils in the Area. A high concentration of sulfate in the soil or water may present a serious hazard to concrete.

Estimated Properties of the Soils

Estimates of soil properties that are significant in engineering are given in table 3. They are based on data shown in table 2, on field examination, and on past experience in engineering construction with soils in the Area or with similar soils from other areas. Since the estimates given in table 3 are only for typical soils, some variation from these values should be anticipated.

Shrink-swell potential in soils refers to the change in volume that results from a change in moisture content, that is, the shrinking of the soil when dry and the swelling when wet. It is estimated on the basis of the amount and kind of clay in the soil. In general, the soil that has the highest clay content shrinks and swells the most. For some soils, however, the kind of clay is a more important factor than the amount. An explanation of the estimates given in table 3 follows. The part of the soil considered is the subsoil or a 10- to 40-inch zone.

Low: 0 to 18 percent clay regardless of predominant clay material, or 0 to 35 percent kaolinitic clay; coefficient of linear extensibility less than 0.03 inch per inch.

Moderate: 18 to 35 percent mixed or montmorillonitic clay, or more than 35 percent kaolinitic clay; coefficient of linear extensibility 0.03 to 0.06 inch per inch.

High: more than 35 percent mixed or montmorillonitic clay; coefficient of linear extensibility greater than 0.06 inch per inch.

The map "Shrink-Swell Potential" is a sheet of the detailed soil map colored to show the low, moderate, or high shrink-swell potential of the soils in one given locality.

Much damage to building foundations, roads, and other structures results from the shrinking and swelling of soils (see pl. I). Soils that have a low shrink-swell potential are suitable for building sites if other factors are favorable. As the shrink-swell potential increases, the soil becomes less suitable. Detailed investigation of a site is needed if the estimate for shrink-swell potential is moderate or high.

The suitability of soils for building sites also depends on their capacity to withstand pressure from foundations. In the column headed "Allowable soil pressure" are estimates that indicate limitations of the soils for supporting foundations, as defined in table 28-B of the Unified Building Code, 1967 edition, volume 1, section 2804. Except for rock, the estimates given in table 3 are for a foundation 1 foot wide, at a minimum depth of 1 foot into the soil; the material to a depth of 1 foot in the soil is not considered. The estimates

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TABLE 2.--PHYSICAL AND

Soil series and location of sample	Depth	Classification			Moisture-density relations				Mechanical analysis 5/		
					Calif. Div. Hwy. 216 3/		ASTM D-1557 Mod. 4/		Percent passing sieve--		
		USDA texture 1/	AASHO	Unified 2/	Maximum dry density	Optimum moisture	Maximum dry density	Optimum moisture	No. 4	No. 8	No. 30
	In.				Lb./cu. ft.	Pct.	Lb./cu. ft.	Pct.			
Camarillo:											
1,600 ft. E. and 1,600 ft. S. of SW. cor. sec. 11,	8-22	Very fine sandy loam.	A-6(5)	CL	115	13	117	13	---	100	98
T. 1 N., R. 21 W.	26-39	Loam-------	A-4(4)	CL	118	13	120	12	---	100	98
Castaic:											
1,500 ft. W. and 600 ft. S. of NE. cor. sec. 19,	3-17	Shaly silty clay loam.	A-7 5(12)	ML	106	17	101	20	12/ 99	98	96
T. 1 S., R. 18 W.	24	Shale-----	--------	---	---	--	---	--	---	---	---
Cropley:											
4,400 ft. S. and 150 ft. W. of intersection of	2-14	Clay------	A-7-6(13)	ML	108	16	110	15	---	---	100
La Loma Rd. and Los Angeles Ave.	28-40	Silty clay loam.	A-7-6(13)	ML	113	15	112	16	---	---	---
Gilroy:											
1,050 ft. W. and 1,250 ft. S. of	3-15	Clay loam--	A-6(7)	CL	108	18	109	17	100	96	84
NE. cor. sec. 3, T. 1 S., R. 18 W.	18-30	Heavy clay loam.	A-7-6(20)	CH	103	20	104	19	12/ 99	98	94
Huerhuero:											
1,500 ft. N. and 200 ft. W. of intersection of	0-13	Very fine sandy loam.	A-4(8)	ML	122	11	122	11	---	100	98
Bradley Rd. and	25-39	Sandy clay--	A-4(8)	ML	116	14	118	12	100	99	98
Los Angeles Ave.	48-57	Very fine sandy loam.	A-4(8)	CL-ML	119	13	120	12	---	100	99
Los Osos:											
600 ft. W. and	2-9	Clay loam -	A-7-5(9)	ML	112	15	112	16	---	100	99
2,200 ft. N. of SE. cor. sec. 21,	15-29	Clay-------	A-6(10)	CL	111	17	115	14	---	100	99
T. 2 N., R. 18 W.											
Malibu:											
2,200 ft. N. and	4-17	Loam-------	A-4(6)	CL	113	15	110	16	12/ 98	94	85
300 ft. W. of SE. cor. sec. 29,	17-29	Clay-------	A-7-6(20)	CH	100	21	101	20	---	100	99
T. 1 S., R. 18 W.											

See footnotes at end of table.

CHEMICAL TEST DATA

Mechanical analysis 5/--Continued							Liquid limit 6/	Plasticity index 6/	Coefficient of linear extensibility 7/	Percent expansion 8/	Resistivity 9/	Reaction 10/	Sulfates (SO_4) 11/
Percent passing sieve--Continued			Percent smaller than--										
No. 50	No. 100	No. 200	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.							
							Pct.		In./in.	60 p.s.f. load	Ohm/cm.	pH	p.p.m.
89	72	55	49	33	20	14	27	13	-----	6.6	263	8.0	81
88	71	56	51	37	24	18	30	9	0.030	6.6	290	8.2	121
94	88	76	71	54	33	21	47	16	0.040	5.8	755	7.6	9
---	---	---	---	---	---	---	--	--	0.008	----	-----	---	---
99	98	94	91	71	54	41	47	18	0.085	13.1	420	8.2	10
100	99	92	88	69	49	34	47	18	-----	10.4	395	8.2	43
76	68	59	55	40	24	17	39	16	-----	2.7	1,000	7.6	10
89	84	79	76	62	45	33	62	47	-----	19.0	500	7.6	15
98	92	77	65	31	18	14	--	13/ NP	-----	3.6	1,920	7.1	12
97	93	79	68	42	31	24	31	6	0.032	13.6	580	7.8	8
97	94	80	69	36	25	17	27	7	-----	----	-----	---	---
98	98	93	89	67	44	31	41	11	-----	8.1	580	7.5	13
99	99	96	92	77	46	34	38	14	-----	13.4	475	7.5	9
80	74	67	63	50	35	27	33	10	0.020	4.8	1,600	6.3	11
98	95	90	87	82	64	52	75	46	0.111	15.2	660	5.7	11

Soil series and location of sample	Depth	Classification			Moisture-density relations				Mechanical analysis 5/		
					Calif. Div. Hwy. 216 3/		ASTM D-1557 Mod. 4/		Percent passing sieve--		
		USDA texture 1/	AASHO	Unified 2/	Maximum dry density	Optimum moisture	Maximum dry density	Optimum moisture	No. 4	No. 8	No. 30
	In.				Lb./cu. ft.	Pct.	Lb./cu. ft.	Pct.			
Metz:											
100 ft. S. and 1,800 ft. E. of NW. cor. sec. 9, T. 2 N., R. 19 W.	12-18	Loamy fine sand.	A-2-4(0)	SM	116	14	114	12	---	100	96
	30-42	Loamy sand-	A-2-4(0)	SM	120	12	120	11	100	99	87
Rincon:											
7,400 ft. S. and 4,200 ft. E. of SW. cor. sec. 25, T. 3 N., R. 21 W.	4-16	Silty clay loam.	A-6(9)	CL	114	14	118	13	---	100	98
	16-25	Sandy clay-	A-6(10)	CL	116	14	117	13	---	100	98
Salinas:											
2,000 ft. S. and 300 ft. E. of intersection of Hwy. 34 and Hwy. 118.	3-16	Clay loam--	A-4(8)	ML	107	17	107	17	---	100	99
	31-45	Clay loam--	A-7-5(1)	ML	103	19	109	16	---	---	100
Sespe:											
3,900 ft. E. and 2,640 ft. S. of building on observation point on Casitas Dam.	0-12	Clay loam--	A-4(8)	ML	111	14	111	15	---	100	99
	26 40	Sandy clay-	A-4(8)	CL-ML	119	14	136	11	---	100	99
Sorrento:											
4,800 ft. E. and 500 ft. S. of intersection of Walnut Ave. and La Loma Rd.	9-15	Silty clay loam.	A-4(8)	ML	102	19	109	15	12/ 99	99	98
	20-30	Silt loam--	A-7-5(9)	ML	98	22	100	20	---	100	99

1/ By field determination. The USDA texture may differ from results obtained by test methods 202 and 203 of the California State Division of Highways. In methods 202 and 203, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from the calculations of grain-size fractions.

2/ A soil having a plasticity index within 2 points of A-line is given a borderline classification. An example of borderline classification is CL-ML.

3/ District VII California State Division of Highways, Method No. 216.

4/ ASTM D-1557, Method A, modified by using three layers instead of five.

5/ District VII California State Division of Highways, Methods No. 202 and 203.

TEST DATA--Continued

Mechanical analysis 5/--Continued							Liquid limit 6/	Plasticity index 6/	Coefficient of linear extensibility 7/	Percent expansion 8/	Resistivity 9/	Reaction 10/	Sulfates (SO_4) 11/
Percent passing sieve--Continued			Percent smaller than--										
No. 50	No. 100	No. 200	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.							
							Pct.		In./in.	60 p.s.f. load	Ohm/cm.	pH	p.p.m.
72	46	26	20	11	7	6	--	NP	-----	0.3	3,600	8.4	8
60	36	23	19	13	9	6	--	NP	-----	1.5	2,530	8.6	8
96	92	81	74	46	32	27	32	12	0.064	9.8	475	7.3	10
95	92	81	74	50	37	29	36	15	0.050	11.9	500	7.9	26
98	97	91	86	63	42	28	40	10	-----	15.0	475	7.7	26
99	98	94	90	68	46	30	45	13	-----	7.3	368	8.3	52
98	94	81	74	49	29	20	31	6	0.017	4.7	1,650	6.5	12
96	87	74	68	48	33	26	28	7	-----	7.3	1,470	6.9	12
97	95	90	87	59	37	25	38	8	0.031	22.2	500	7.8	23
98	97	92	88	60	34	19	44	11	-----	10.2	420	8.3	37

6/ District VII California State Division of Highways, Method No. 204.

7/ Special Test by USDA Soil Survey Laboratory, Riverside, Calif.

8/ Ventura County: Test Method for Linear Expansion of Soils.

9/ Ventura County: California Test Method No. 643B.

10/ Ventura County: California Test Method No. 643B, by electrical pH meter.

11/ Standard Methods for the Examination of Water and Waste Water, American Public Health Association, American Waterworks Association, and Water Pollution Control Federation.

12/ 100 percent passed 3/4-inch sieve.

13/ Nonplastic.

TABLE 3.--ESTIMATED

[Dashes indicate a determination was not

Soil series and map symbols	Depth to--		Shrink-swell potential	Allowable soil pressure	Depth from surface (typical profile)	Classification		
	Bedrock	Seasonal high water table				USDA texture	Unified	AASHO
	Ft.	Ft.			In.			
Anacapa:								
AcA, AcC	5	(1/)	Low	Moderate.	0-60	Sandy loam	SM	A-2
AnC	5	(1/)	Low	Moderate.	0-60	Gravelly sandy loam.	SM	A-2
Arnold: AsF	5	(1/)	Low	Severe.	0-65	Sand to loamy fine sand.	SP-SM	A-3
Azule: AuB, AuC2, AuD, AzC.	5	(1/)	High	Moderate.	0-10	Loam	ML	A-4
					10-40	Sandy clay	CL	A-6
					40-60	Sandy clay loam (Profile gravelly in places.)	SC	A-6
Badland: BdG	0.5-1.0	(1/)	Moderate	Severe.	0-10	(3/).		
Balcom (Mapped only with Castaic soils.)	2.0-3.5	(1/)	Moderate	Moderate.	0-23	Loam	ML or CL	A-4
					23-60	Weak shale crushing easily to loam.		
Calleguas: CaE2, CaF, CbF2. For Arnold part of CbF2, see Arnold series.	0.5-1.5	(1/)	Low	Moderate.	0-18	Very shaly loam	GM	A-2
					18	Hard shale.		
Camarillo:								
Cc	5	2-5	Moderate	Moderate.	0-24	Sandy loam	SM	A-2
					24-44	Heavy loam and fine sandy clay loam.	CL	A-4 or A-6
					44-68	Sandy loam and fine sand.	SM	A-2
Cd	5	2-5	Moderate	Moderate.	0-60	Loam	ML or CL	A-4 or A-6
Ce	5	2-5	Moderate	Moderate.	0-40	Loam	ML or CL	A-4 or A-6
					40-60	Sand	SP	A-3
Castaic: CfD2, CfE, CfF2, CfG2, CgG2. For Saugus part of CgG2, see Saugus series. For Balcom part of other units, see Balcom series.	2.0-3.5	(1/)	Moderate 4/	Moderate.	0-26	Silty clay loam	ML or CL	A-7
					26	Soft shale crushing easily to silty clay loam.	--------	-----

See footnotes at end of table.

PROPERTIES OF SOILS
made or that it would not be applicable]

Percentage passing sieve--					Atterberg values		Permeability	Available water holding capacity	Reaction	Salinity
3-in.	No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index				
					Pct.	2/	In./hr.	In./in. of soil	pH	Mmhos./cm. at 25° C.
100	90-100	85-100	60-70	25-35	-----	NP	2.0-6.3	0.11-0.13	7.4-8.4	0-2
100	80-90	75-85	50-60	20-30	-----	NP	2.0-6.3	0.09-0.11	7.4-8.4	0-2
100	100	90-100	50-70	5-10	-----	NP	6.3-20.0	0.06-0.08	5.1-6.5	0-2
100	95-100	85-100	80-95	50-60	25-35	5-10	0.63-2.0	0.14-0.18	5.6-6.5	0-2
100	90-100	80-100	75-100	70-80	25-40	5-20	0.06-0.2	0.12-0.16	6.1-7.8	0-2
90-100	85-100	65-100	80-90	35-50	25-35	5-15	0.2-0.63	0.10-0.16	6.1-8.4	0-2
100	100	95-100	85-95	50-70	25-35	5-10	0.63-2.0	0.16-0.18	7.9-8.4	0-2
100	40-55	40-55	30-40	15-25	25-30	5-10	0.63-2.0	0.05-0.07	7.4-8.4	0-2
100	95-100	95-100	60-70	25-35	-----	NP	2.0-6.3	0.11-0.13	7.4-8.4	2-4
100	100	95-100	85-95	60-75	25-35	5-15	0.63-2.0	0.16-0.18	7.9-8.5	2-8
100	95-100	95-100	60-70	25-35	-----	NP	2.0-6.3	0.10-0.12	7.9-8.5	2-8
100	100	90-100	85-95	50-70	25-35	5-15	0.63-2.0	0.16-0.18	7.4-8.4	2-8
100	100	90-100	85-95	50-70	25-35	5-15	0.63-2.0	0.16-0.18	7.4-8.4	2-4
100	100	90-100	50-70	0-5	-----	NP	20.0	0.06-0.08	7.4-8.4	2-8
100	100	95-100	90-100	70-80	40-50	10-20	0.2-0.63	0.18-0.20	6.1-7.8	0-2
------	------	------	------	------	-----	-----	---------	---------	7.5-8.5	---

Soil series and map symbols	Depth to--		Shrink-swell potential	Allowable soil pressure	Depth from surface (typical profile)	Classification		
	Bedrock	Seasonal high water table				USDA texture	Unified	AASHO
	Ft.	Ft.			In.			
Chesterton: ChD2, CkE3	>5	(1/)	High	Slight.	0-10	Sandy loam	SM	A-2
					10-26	Sandy clay	ML or CL	A-4 or A-6
					26-36	Hardpan		
					36-60	Sandy clay loam	SC	A-6
Cibo: CmD, CmE	2-4.5	(1/)	High	Moderate.	0-24	Clay	CL	A-7
					24	Basic igneous rock.		
Coastal beaches: CnB	>5	0-5	Low	Severe.	0-60	Sand	SP or GP	A-3, A-1
Corralitos: CoA, CoC	>5	(1/)	Low	Severe.	0-57	Loamy coarse sand and fine sand (gravelly in places).	SM	A-2
Cortina: CrC, CsD	>5	(1/)	Low	Moderate.	0-60	Very stony and cobbly sandy loam and sand.	SM or GM	A-1
Cropley:								
CyA, CyC	>5	(1/)	High	Moderate.	0-60	Clay and silty clay loam.	ML	A-7
Cz	>5	3-5	High	Moderate.	0-60	Clay to clay loam.	ML	A-7
Diablo: DbD, DbE, DbF	3.5-4.5	(1/)	High	Moderate.	0-28	Clay	CL	A-7
					28-40	Clay loam	CL	A-6
					40	Soft fractured shale.		
Fill land: Fd	>5	3-5	Low	Moderate.	(3/)			
Garretson:								
GaA, GaC	>5	(1/)	Moderate	Moderate.	0-56	Loam	ML or CL	A-4
					56-61	Gravelly fine sandy loam.	SM	A-2 or A-4
GbC	>5	(1/)	Moderate	Moderate.	0-61	Gravelly loam	ML	A-4
GcB	>5	(1/)	Moderate	Moderate.	0-60	Silt loam	ML	A-4
Gaviota: GrF	0.5-1.5	(1/)	Low	Moderate.	0-8	Sandy loam	SM	A-2
					8	Sandstone.		
Gazos: GsE, GsF, GsG	2-4	(1/)	Moderate	Moderate.	0-46	Shaly silty clay loam.	GM	A-4 or A-6
					46	Shale.		
Gilroy: GtD, GtE, GvF	1.5-3.5	(1/)	Moderate	Moderate.	0-21	Clay loam	CL	A-6
					21	Basic igneous rock.		
Gullied land: GxG	0-1	(1/)	Moderate	Severe.	(3/)			

See footnotes at end of table.

OF SOILS--Continued

Percentage passing sieve--					Atterberg values		Permeability	Available water holding capacity	Reaction	Salinity
3-in.	No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index				
					Pct.		In./hr.	In./in. of soil	pH	Mmhos./cm. at 25°C.
100	95-100	95-100	60-70	25-35	-----	NP	2.0-6.3	0.11-0.13	5.6-6.5	0-2
100	100	95-100	90-100	70-80	25-40	5-20	0.06-0.2	0.14-0.16	5.6-6.5	0-2
------	------	------	------	------	-----	-----	<0.06	---------	5.6-6.5	---
100	100	90-100	80-90	35-50	25-35	5-15	0.2-0.63	0.14-0.16	7.4-7.8	0-2
100	100	100	90-100	85-95	40-45	10-20	0.06-0.20	0.14-0.16	6.1-7.3	0-2
100	80-100	70-100	50-70	0-5	-----	NP	>20.0	0.04-0.06	-------	0-16
100	100	85-100	50-75	15 30	-----	NP	>20.0	0.06-0.08	6.1-7.3	0-2
40-70	35-50	25 35	15-25	5-10	-----	NP	6.3-20.0	0.04-0.06	6.1-7.8	0-2
100	100	100	100	90-100	45-50	15-20	0.06-0.2	0.14-0.16	6.6-8.4	0-2
100	100	100	100	90-100	45-50	15-20	0.06-0.2	0.14-0.16	6.6-8.4	2-4
100	100	100	95-100	95-100	40-50	15-25	0.06-0.2	0.14-0.16	6.1-8.4	0-2
100	100	95-100	90-100	90-100	40-50	15-25	0.2-0.63	0.18-0.20	7.9-8.4	0-2
100	100	85-100	85-95	60-70	20-30	5-10	0.63-2.0	0.16-0.18	6.1-7.8	0-2
100	80-95	65-85	45-70	30-50	-----	NP	0.63-2.0	0.07-0.09	7.4-7.8	0-2
100	85-95	65-85	55-75	50 60	20-30	5-10	0.63-2.0	0.08-0.10	6.1-7.8	0-2
100	100	100	95-100	90-95	30-40	5-10	0.63-2.0	0.18-0.20	7.9-8.4	0-2
100	95-100	90-95	60-70	25-35	-----	NP	2.0-6.3	0.10-0.12	6.1-7.3	0-2
90-100	65-80	50-65	45-65	35-50	30-40	5-20	0.2-0.63	0.10-0.12	5.6-7.3	0-2
100	100	90-100	75-90	55-65	30-40	15-20	0.2-0.63	0.18-0.20	5.6-7.3	0-2

TABLE 3.--ESTIMATED PROPERTIES

Soil series and map symbols	Depth to--		Shrink-swell potential	Allowable soil pressure	Depth from surface (typical profile)	Classification		
	Bedrock	Seasonal high water table				USDA texture	Unified	AASHO
	Ft.	Ft.			In.			
Hambright: HaG, HbF---	0.5-1.5	(1/)	Moderate--	Moderate.	0-14 14	Stony clay loam- Basic igneous rock.	SC	A-6
Hueneme: Hm, Hn-------	>5	2.5-5.0	Low-------	Moderate.	0-65	Sandy loam stratified.	SM	A-2
Huerhuero: HuB, HuC2, HuD2, HuE3.	>5	(1/)	Moderate--	Moderate.	0-25	Very fine sandy loam.	ML	A-4
					25-48	Sandy clay-----	ML or CL	A-4 or A-6
					48-57	Very fine sandy loam.	CL-ML	A-4
Igneous rock land: IrG	0-1	(1/)	Low-------	Slight.	0-10	(3/).		
Kimball: KmC2, KmD2---	>5	(1/)	Moderate--	Moderate.	0-15	Sandy loam-----	SM	A-2
					15-60	Sandy clay-----	ML or CL	A-4 or A-6
Landslides: LaF-------	2-4	(1/)	Moderate--	Severe.	0-36	(3/).		
Linne: LeD2, LeE2, LeF2.	2-4	(1/)	Moderate--	Moderate.	0-48 48	Silty clay loam- Weathered calcareous shale.	ML or CL	A-6
Lodo: LkF----------	0.5-1.5	(1/)	Moderate--	Moderate.	0-16	Gravelly light clay loam.	CL	A-6
					16	Hard shale.		
Los Osos: LoD2, LoE2, LoF.	2-4	(1/)	High------	Moderate.	0-36 36	Clay---------- Shale.	CL	A-7
Malibu: MaD2, MaE2, MaF.	2-3	(1/)	High------	Moderate.	0-14	Loam----------	CL	A-4
					14-23	Clay----------	CH	A-7
					23	Shale.		
Metz:								
McA, McC----------	>5	(1/)	Low-------	Severe.	0-60	Loamy fine sand-	SM	A-2
MeA, MeC----------	>5	(1/)	Low-------	Severe.	0-60	Stratified loamy sand and sand.	SM	A-2
MfA----------	>5	(1/)	Low-------	Severe.	0-40	Stratified loamy sand and sand.	SM	A-2
					40-60	Stratified silt loam, sandy loam, and loamy very fine sand.	SM	A-2 or A-4
Millsholm: MhF, MkG, MmF2. For Malibu part of MmF2, see Malibu series.	1.0-2.0	(1/)	Moderate 5/	Moderate.	0-18	Loam to light clay loam (gravelly in places).	CL	A-6
					18	Shale.		

See footnotes at end of table.

OF SOILS--Continued

Percentage passing sieve--					Atterberg values		Permeability	Available water holding capacity	Reaction	Salinity
3-in.	No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index				
					Pct.		In./hr.	In./in. of soil	pH	Mmhos./cm. at 25°C.
70-90	65-75	60-80	40-60	35-50	30-40	15-20	0.63-2.0	0.10-0.12	5.6-6.5	0-2
100	100	95-100	60-70	25-35	-----	NP	0.63-6.3	0.08-0.12	7.4-8.4	2-4
100	100	95-100	95-100	70-80	-----	NP	0.63-2.0	0.15-0.17	6.1-7.3	0-2
100	100	95-100	90-100	70-90	25-35	5-15	<0.06	0.04-0.06	6.6-8.4	0-2
100	100	95-100	95-100	70-80	20-30	5-10	0.63-2.0	0.15-0.17	7.9-8.4	0-2
100	100	95-100	60-70	25-35	-----	NP	2.0-6.3	0.11-0.13	5.6-6.5	0-2
100	100	95-100	90-100	70-80	25-35	5-15	0.06-0.2	0.12-0.17	5.6-6.5	0-2
100	100	95-100	90-100	70-80	30-40	10-20	0.2-0.63	0.18-0.20	7.9-8.4	0-2
100	100	75-85	60-75	50-60	25-35	10-15	0.63-2.0	0.15-0.17	5.6-7.3	0-2
100	100	100	95-100	95-100	35-50	10-20	0.06-0.2	0.14-0.16	5.6-7.3	0-2
100	95-100	90-100	80-90	60-70	30-40	5-10	0.63-2.0	0.16-0.18	5.6-6.5	0-2
100	100	95-100	95-100	85-95	70-80	45-50	<0.06	0.14-0.16	5.1-6.0	0-2
100	100	100	75-85	20-30	-----	NP	6.3-20.0	0.08-0.10	7.4-8.4	0-2
100	100	90-100	65-75	20-30	-----	NP	6.3-20.0	0.06-0.08	7.4-8.4	0-2
100	100	90-100	80-90	20-30	-----	NP	6.3-20.0	0.06-0.08	7.4-8.4	0-2
100	100	100	60-70	30-40	-----	NP	2.0-6.3	0.11-0.13	7.4-8.4	0-2
100	95-100	90-100	85-95	70-80	25-35	10-15	0.2-0.63	0.17-0.19	6.1-7.3	0-2

Soil series and map symbols	Depth to--		Shrink-swell potential	Allowable soil pressure	Depth from surface (typical profile)	Classification		
	Bedrock	Seasonal high water table				USDA texture	Unified	AASHO
	Ft.	Ft.			In.			
Mocho:								
MoA, MoC	>5	(1/)	Moderate	Moderate.	0-60	Loam	ML or CL	A-4
MrC	>5	(1/)	Moderate	Moderate.	0-60	Gravelly loam	ML or CL	A-4
MsA, MsB	>5	(1/)	Moderate	Moderate.	0-60	Clay loam	CL	A-7
Nacimiento: NaD2, NaE2, NaF, NaG.	2.0-3.5	(1/)	Moderate	Moderate.	0-30 30	Silty clay loam Firm shale.	ML or CL	A-6
Ojai:								
OhA, OhC2, OhD2	>5	(1/)	Moderate	Moderate.	0-16	Very fine sandy loam.	ML	A-4
					16-36	Sandy clay loam	SC or CL	A-4 or A-6
					36-55	Very cobbly and gravelly light clay.	GC	A-2
OsD2, OsE2	>5	(1/)	Moderate	Moderate.	0-16	Stony fine sandy loam.	SM	A-2
					16-36	Sandy clay loam	SC or CL	A-4 or A-6
					36-55	Very cobbly and gravelly light clay.	GC	A-2
Pacheco: Pa	>5	2-3	Moderate	Moderate.	0-46	Silty clay loam	ML or CL	A-6
					46-67	Stratified silt and sand.	---	---
Pico:								
PcA, PcC	>5	(1/)	Low	Moderate.	0-54	Sandy loam	SM	A-2
					54-60	Gravelly coarse sand.	SP or SM	A-1
PsA	>5	(1/)	Low	Moderate.	0-18	Loam	ML or CL	A-4
					18-36	Sandy loam	SM	A-2
					36-59	Gravelly and stony coarse sand.	SP	A-1
Pits and dumps: PxG 3/	---	---	Low	Severe.				
Rincon: RcC, RcD2, RcE2, RcE3.	>5	(1/)	High	Moderate.	0-16	Silty clay loam	CL	A-6
					16-31	Sandy clay	CL	A-6
					31-60	Sandy clay loam	SC	A-6
Riverwash: Rw	>5	0-5	Low	Severe.	0-60	Stratified stony and gravelly sand.	SM	A-1 or A-2
Salinas: SaA, SaC	>5	(1/)	Moderate	Moderate.	0-45	Clay loam	CL, ML	A-7, A-4
					45-60	Silt loam	ML	A-4

See footnotes at end of table.

OF SOILS--Continued

Percentage passing sieve--					Atterberg values		Permeability	Available water holding capacity	Reaction	Salinity
3-in.	No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index				
					Pct.		In./hr.	In./in. of soil	pH	Mmhos./cm. at 25°C.
100	95-100	90-100	85-95	60-70	25-35	5-10	0.63-2.0	0.16-0.18	7.9-8.4	0-2
100	80-90	75-85	70-80	50-60	25-35	5-10	0.63-2.0	0.10-0.13	7.9-8.4	0-2
100	100	95-100	90-100	85-95	40-45	10-15	0.2-0.63	0.18-0.20	7.9-8.4	0-2
100	100	95-100	90-100	70-80	30-40	10-20	0.2-0.63	0.18-0.20	7.9-8.4	0-2
100	100	95-100	85-95	50-60	10-20	5-10	0.63-2.0	0.15-0.17	5.6-6.5	0-2
100	95-100	90-100	80-90	35-55	20-30	5-15	0.2-0.63	0.14-0.16	6.1-7.3	0-2
60-70	30-55	25-50	15-30	10-20	40-50	10-20	0.2-0.63	0.04-0.06	6.1-7.3	0-2
75-90	70-80	65-75	50-70	20-30	-----	NP	2.0-6.3	0.10-0.12	5.6-6.5	0-2
100	95-100	90-100	80-90	35-55	20-30	5-15	0.2-0.63	0.14-0.16	6.1-7.3	0-2
60-70	30-55	25-50	15-30	10-20	40-50	10-20	0.2-0.63	0.04-0.06	6.1-7.3	0-2
100	100	100	95-100	85-95	30-40	10-20	0.2-0.63	0.18-0.20	7.4-9.0	2-4
------	------	------	------	-----	-----	-----	0.2-20.0	0.06-0.17	7.9-9.0	2-8
100	95-100	90-95	50-70	20-35	-----	NP	2.0-6.3	0.11-0.13	7.9-8.4	0-2
100	75-90	70-85	40-50	10-15	-----	NP	6.3-20.0	0.05-0.07	7.9-8.4	0-2
100	100	85-100	85-95	50-70	25-35	5-10	0.63-2.0	0.16-0.18	7.9-8.4	0-2
100	95-100	90-95	50-70	20-35	-----	NP	2.0-6.3	0.11-0.13	7.9-8.4	0-2
80-90	70-80	70-80	40-50	0-5	-----	NP	6.3-20.0	0.05-0.07	7.9-8.4	0-2
100	100	95-100	90-100	80-90	25-35	5-15	0.2-0.63	0.19-0.21	6.1-7.3	0-2
100	100	95-100	90-100	70-80	30-40	10-15	0.06-0.2	0.15-0.17	6.6-8.4	0-2
100	100	90-100	80-90	35-50	25-35	5-15	0.2-0.63	0.14-0.16	7.4-8. 4	0-2
60-80	60-75	50-70	30-45	10-15	-----	NP	>20.0	0.05-0.07	-------	---
100	100	95-100	90-100	85-95	40-45	10-15	0.2-0.63	0.19-0.21	6.6-7.8	0-2
100	100	100	95-100	90-95	30-40	5-10	0.63-2.0	0.18-0.20	7.4-8.4	0-2

Soil series and map symbols	Depth to--		Shrink-swell potential	Allowable soil pressure	Depth from surface (typical profile)	Classification		
	Bedrock	Seasonal high water table				USDA texture	Unified	AASHO
	Ft.	Ft.			In.			
San Andreas: SbF------	>5	(1/)	Low-------	Moderate.	0-37	Sandy loam and heavy sandy loam.	SM	A-2, A-4
					37-60	Loamy coarse sand.	SM	A-2
San Benito: ScD2, ScE2, ScF2, ScG.	4-5	(1/)	Moderate--	Moderate.	0-60	Clay loam-------	CL	A-7
Sandy alluvial land: Sd.	>5	(1/)	Low-------	Moderate.	0-60	Stratified loamy sand and sandy loam.	SM	A-2
Santa Lucia: SeE, SeF, SeG.	1.5-3.0	(1/)	Low-------	Moderate.	0-13	Shaly silty clay loam.	GC	A-6 or A-4
					13-33	Very shaly silty clay loam.	GC	A-2
					33	Shale.		
Saugus: ShE, ShF2------	5-6	(1/)	Low-------	Moderate.	0-60	Sandy loam------	SM	A-2
Sedimentary rock land: SnG.	0-1	(1/)	Moderate--	Severe.	(3/)			
Sespe: SoE2, SoF, SoG--	2-4	(1/)	Moderate--	Moderate.	0-18	Clay loam-------	ML	A-4
					18-40	Sandy clay------	ML or CL	A-4 or A-6
					40	Sandstone.		
Soper: SsE2, SvF2------	>5	(1/)	Moderate--	Moderate.	0-11	Loam and gravelly loam.	ML	A-4
					11-57	Gravelly sandy clay loam.	SC	A-2
					57	Weakly cemented sand, gravel, and stones.		
Sorrento:								
SwA, SwC------------	>5	(1/)	Moderate--	Moderate.	0-60	Loam------------	ML or CL	A-4
SxA, SxC------------	>5	(1/)	Moderate--	Moderate.	0-60	Silty clay loam-	ML or CL	A-4
SzC, SzD------------	>5	(1/)	High------	Moderate.	0-60	Clay loam-------	ML	A-7
Terrace escarpments: TeF.	>5	(1/)	Moderate--	Severe.	(3/)			
Tidal flats: Ts--------	>5	(1/)	Moderate--	Severe.	0-60	Highly stratified; averages clay loam when mixed.	(3/)	

See footnotes at end of table.

OF SOILS--Continued

Percentage passing sieve--					Atterberg values		Permeability	Available water holding capacity	Reaction	Salinity
3-in.	No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index				
					Pct.		In./hr.	In./in. of soil	pH	Mmhos./cm. at 25°C.
100	90-100	85-100	55-70	25-40	-----	NP	0.63-2.0	0.11-0.14	5.6-7.3	0-2
100	75-95	65-95	50-65	15-30	-----	NP	6.3-20.0	0.06-0.08	5.6-6.5	0-2
100	100	95-100	90-100	85-95	40-45	10-15	0.2-0.63	0.17-0.19	6.6-8.4	0-2
95-100	90-100	85-95	50-75	15-35	-----	NP	> 20.0	0.06-0.12	6.6-8.4	0-2
85-95	70-90	65-85	40-60	35-50	30-40	10-20	0.63-2.0	0.14-0.16	5.6-6.5	0-2
80-90	30-55	25-50	20-40	15-30	30-40	10-20	0.63-2.0	0.08-0.10	5.6-6.5	0-2
100	95-100	95-100	60-70	25-35	-----	NP	0.63-2.0	0.11-0.13	6.1-7.8	0-2
100	100	95-100	90-100	80-95	30-40	5-10	0.2-0.63	0.19-0.21	5.6-7.3	0-2
100	100	95-100	90-100	70-90	25-35	5-15	0.06-0.2	0.15-0.17	6.1-7.3	0-2
95-100	70-95	65-90	50-95	50-60	25-35	5-10	0.63-2.0	0.14-0.18	6.1-6.5	0-2
70-85	60-70	50-65	35-50	25-35	25-35	5-10	0.2-0.63	0.10-0.14	6.6-7.8	0-2
100	100	85-100	85-95	60-70	20-30	5-10	0.63-2.0	0.16-0.18	6.1-8.4	0-2
100	100	95-100	90-100	85-95	35 40	5-10	0.2-0.63	0.19-0.21	6.1-7.8	0-2
100	100	95-100	90-100	85-95	45-50	15-20	0.06-0.2	0.17-0.19	6.1-8.4	0-2

TABLE 3.--ESTIMATED PROPERTIES

Soil series and map symbols	Depth to--		Shrink-swell potential	Allowable soil pressure	Depth from surface (typical profile)	Classification		
	Bedrock	Seasonal high water table				USDA texture	Unified	AASHO
	Ft.	Ft.			In.			
Vina:								
VaA, VaC	>5	(1/)	Moderate	Moderate.	0-60	Loam and very fine sandy loam.	ML or CL	A-4
VnC	>5	(1/)	Moderate	Moderate.	0-60	Gravelly loam	ML or CL	A-4
VsC	>5	(1/)	Moderate	Moderate.	0-60	Silty clay loam	ML or CL	A-4
Zamora: ZmC, ZmD2	>5	(1/)	Moderate	Moderate.	0-17	Loam	ML or CL	A-4
					17-40	Clay loam	CL	A-7
					40-52	Sandy loam	SM	A-2

1/ Not high enough to be significant.
2/ Nonplastic.
3/ Variable and unclassified.

Percentage passing sieve--					Atterberg values		Permeability	Available water holding capacity	Reaction	Salinity
3-in.	No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index				
					Pct.		In./hr.	In./in. of soil	pH	Mmhos./cm. at 25°C.
100	100	85-100	85-95	60-70	20-30	5-10	0.63-2.0	0.16-0.18	6.1-8.4	0-2
100	80-90	75-85	70-80	50-60	20-30	5-10	0.63-2.0	0.12-0.14	6.1-8.4	0-2
100	100	95-100	90-100	85-95	35-40	5-10	0.2-0.63	0.17-0.19	6.1-8.4	0-2
100	100	85-100	85-95	60-70	20-30	5-10	0.63-2.0	0.16-0.18	6.1-7.3	0-2
100	100	95-100	90-100	85-95	40-45	10-15	0.2-0.63	0.19-0.21	6.6-7.3	0-2
100	90-100	90-95	50-70	20-35	-----	NP	0.63-2.0	0.11-0.13	7.4-8.4	0-2

4/ Use this rating for mapping unit CgG2 if making a single-purpose map.

5/ Use rating "high," as shown for Malibu soils, for mapping unit MmF2 if making a single-purpose map.

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are based on soil texture and on the consistence of the material when dry. Hard, nonexpansive clay, for example, has only a slight limitation, and a very coarse sand that is soft or loose has a severe limitation. The estimates in table 3 are only for general planning purposes. They are not to be substituted for detailed, onsite investigation.

Permeability indicates the rate at which water moves through undisturbed soil. The rate depends largely on the structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from the use of the soils are not considered.

Available water holding capacity is the amount of capillary water in the soil available to plants, after all free water has drained away. It is that amount of water in the soil between field capacity and wilting point. In table 3, available water holding capacity is expressed in inches per inch for each major horizon.

Reaction, the degree of acidity or alkalinity, is expressed as pH value. The pH values given in table 3 were determined by use of a Troug Soil Reaction Test Kit. The pH value and relative terms used to describe soil reaction are explained in the Glossary.

Salinity of a soil is based on the electrical conductivity of saturated soil extract, as expressed in millimhos per centimeter at 25° C. Salinity affects the suitability of a soil for crop production, its stability when used as construction material, and its corrosiveness to other material.

FARM AND NONFARM INTERPRETATIONS

Table 4 shows soil groupings related to crop production, gives estimates of the limitation and suitability of each soil in the Area for selected nonfarm uses, and lists specific soil features that affect certain engineering practices. The interpretations are based on field examination and experience. They are given for typical soils; hence, some variation from the values in table 4 should be anticipated.

Features of the soils that determine the interpretations shown in table 4 are explained on the pages that follow. It should be noted that the least favorable feature determines the rating. It should also be noted that unfavorable features do not add up to a cumulative rating; for example, several moderate limitations for a soil do not add up to a severe limitation.

The information given in this section is intended only as a guide. It is not a substitute for the detailed information given in the section "Descriptions of the Soils," and it does not eliminate the need for onsite investigation.

Capability unit.--The capability unit is a grouping of soils that are suited to about the same crops and the same management. A detailed explanation of the capability classification is given under the heading "Capability Grouping."

Vegetative soil groups.--Seven of the vegetative soil groups in the statewide system are recognized in the Ventura Area. Each group consists of soils that have similar properties and qualities and are suited to about the same plants and the same management. The grouping is used chiefly in determining the choice of plants by defining the major limiting soil features. Not considered in the determinations were precipitation, maximum and minimum temperatures, the length of the growing season, and the possibility of irrigation.

Group A. Choice of plants is not limited. Soils have no major limitation. They are more than 36 inches deep. Texture of surface layer ranges from sandy loam through silty clay loam. Drainage is moderately good to good, permeability is moderately rapid to slow in subsoil, and available water holding capacity for entire profile is more than 5 inches.

Group B. Choice of plants is limited by droughtiness and low fertility. Soils are generally more than 36 inches deep. Texture of surface layer is sand, loamy sand, stony sandy loam, or stony fine sandy loam. Drainage is good to somewhat excessive, permeability is very rapid to moderately slow in subsoil, and available water holding capacity for entire profile is generally less than 5 inches.

Group C. Choice of plants is limited by fine texture. Soils are more than 20 inches deep. Texture of surface layer is clay, silty clay, or gravelly clay. Drainage is moderately good or good, permeability is moderate to slow in subsoil, and available water holding capacity for entire profile is more than 5 inches.

Group D. Choice of plants is limited by slowly or very slowly permeable (clayey) subsoil. Soils are 10 to 36 inches deep. Texture of surface layer ranges from sandy loam through silty clay loam. Drainage is good to somewhat poor, permeability is slow or very slow in subsoil, and available water holding capacity for entire profile is more than 3 inches.

Group E. Choice of plants is limited by wetness. Soils are more than 20 inches deep. Texture of surface layer ranges from sand through clay. Natural drainage is poor or somewhat poor, permeability ranges from rapid to slow in subsoil, and available water holding capacity for entire profile is more than 3 inches.

Group G. Choice of plants is limited by depth. Soils are as shallow as 20 inches over bedrock. Texture of surface layer is loam, gravelly loam, clay loam, rocky clay loam, or shaly silty clay loam. Drainage is good, permeability is moderate, moderately slow, or slow in subsoil, and available water holding capacity for entire profile is more than 2.5 inches.

Group J. Choice of plants depends on onsite investigation. Group includes Fill land, all soils and land types in capability classes VII and VIII, and very cobbly, very rocky, or very stony soils. Most are not suitable for cultivation, seeding, and planting.

Hydrologic soil groups.--Four hydrologic soil groups are used for estimating the runoff potential of soils. Groupings are based on soil properties that influence runoff. The potential is calculated on water intake at the end of a long-duration storm that occurs after prior wetting and opportunity for swelling of a soil not protected by vegetation.

Group A. Soils have high infiltration rate when thoroughly wetted: chiefly deep, well-drained to excessively drained sand, gravel, or both. Rate of water transmission is high; thus, runoff potential is low.

Group B. Soils have moderate infiltration rate when thoroughly wetted: chiefly soils that are moderately deep to deep, moderately well drained to well drained, and moderately coarse textured. Rate of water transmission is moderate.

Group C. Soils have slow infiltration rate when thoroughly wetted: chiefly soils that have layer impeding downward movement of water, or moderately fine textured to fine textured soils that have slow infiltration rate when dry. Rate of water transmission is slow.

Group D. Soils have very slow infiltration rate when thoroughly wetted: chiefly clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near surface, or soils that are shallow over nearly impervious material. Rate of water transmission is very slow.

The map "Hydrologic Soil Groups" is a sheet of the detailed soil map colored to show differences in the estimated runoff potential among the soils in one given locality. The hydrologic group designation for each soil in the Area can be found in the "Guide to Mapping Units" or in table 4.

Play areas.--Areas used for playgrounds and for organized games, including baseball, football, badminton, and volleyball. Areas are subject to heavy foot traffic and require a nearly level, firm surface and good drainage. They should be essentially free of rock outcrops and coarse fragments. Irrigation water should be available if the area is one that ordinarily requires a turf.

The degree of limitation given in table 4 is based on soil properties. It does not apply to other factors that may be important in selecting a site. The need for topdressing is not considered. If dust is a problem, the limitation is severe. The degrees of limitation are defined as follows.

Slight. Soil has all of the following features: Slope is less than 2 percent. Texture of surface layer is sandy loam, fine sandy loam, very fine sandy loam, or loam. Content of gravel or cobblestones is less than 1 percent. Surface is less than 0.1 percent covered by stones and less than 2 percent covered by rock outcrop. Depth to hardpan, hard bedrock, or seasonal high water table is more than 40 inches. Natural drainage is somewhat excessive, good, or moderately good. Permeability is rapid, moderately rapid, or moderate.

Moderate. Soil has one or more of the following features: Slope is 2 to 5 percent. Texture of surface layer is loamy sand, silt loam, clay loam, sandy clay loam, or silty clay loam. Content of gravel or cobblestones is less than 15 percent. Surface is 0.01 to 3 percent covered by stones and 2 to 10 percent covered by rock outcrop. Depth to hardpan, hard bedrock, or seasonal high water table is 20 to 40 inches. Natural drainage is excessive or somewhat poor. Permeability is very rapid or moderately slow.

Severe. Soil has one or more of the following features: Slope is more than 5 percent. Texture of surface layer is sand, sandy clay, silty clay, or clay. Content of gravel or cobblestones is 15 percent or more. Surface is more than 3 percent covered by stones and more than 10 percent covered by rock outcrop. Depth to hardpan, hard bedrock, or seasonal high water table is less than 20 inches. Natural drainage is poor or very poor. Permeability is slow or very slow.

Golf fairways and lawns.--Table 4 gives the degree of limitation of the soils for lawns around residences, factories, apartment houses, and school buildings, and for intensively used parks and golf fairways. Greens and sandtraps are not considered part of a fairway. The limitation is based on soil properties and qualities, not on other factors that may be important in selecting a site. The need for leveling, for topsoil, or for certain kinds of grass is not considered. The degrees of limitation are defined as follows.

Slight. Soil has all of the following features: Slope is less than 2 percent. Texture of surface layer is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam. There are no cobblestones, stones, or rocks. Depth to hardpan, hard bedrock, or seasonal water table is more than 40 inches. Drainage is good or moderately good. Permeability of subsoil is moderate or moderately rapid. Available water holding capac-

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
AcA	Anacapa sandy loam, 0 to 2 percent slopes.	IIs-4	A	B	Slight----	Slight----	Slight----	Slight-----	Slight---
AcC	Anacapa sandy loam, 2 to 9 percent slopes.	IIe-1	A	B	Moderate--	Moderate--	Moderate--	Slight-----	Slight---
AnC	Anacapa gravelly sandy loam, 2 to 9 percent slopes.	IIe 1	A	B	Severe	Moderate--	Moderate--	Slight-----	Slight---
AsF	Arnold sand, 9 to 50 percent slopes.	VIIs-4	J	A	Severe----	Severe	Severe----	Slight-----	Slight---
AuB	Azule loam, 0 to 5 percent slopes.	IIe-3	D	C	Moderate--	Severe----	Severe----	Slight-----	Severe---
AuC2	Azule loam, 2 to 9 percent slopes, eroded.	IIIe-3	D	C	Severe----	Severe----	Severe----	Slight-----	Severe---
AuD	Azule loam, 9 to 15 percent slopes.	IVe-3	D	C	Severe----	Severe----	Severe----	Slight-----	Severe---
AzC	Azule gravelly loam, 5 to 9 percent slopes.	IIIe-3	D	C	Severe----	Severe----	Severe----	Slight-----	Severe---
BdG	Badland----------	VIIIe-1	J	D	Severe----	Severe----	Severe----	Slight-----	Very severe.
CaE2	Calleguas shaly loam, 9 to 30 percent slopes, eroded.	VIIe-1	J	D	Severe----	Severe----	Severe----	Severe-----	Very severe.
CaF	Calleguas shaly loam, 30 to 50 percent slopes.	VIIe-1	J	D	Severe----	Severe----	Severe----	Severe-----	Very severe.
CbF2	Calleguas-Arnold complex, 30 to 50 percent slopes, eroded: Calleguas----------	VIIe-1	J	1/ D	Severe----	Severe----	Severe----	Severe-----	Very severe. 1/

See footnotes at end of table.

Suitability as a source of--				Soil features affecting--			
					Water retention structures		
Topsoil	Sand	Gravel	Road fill	Road location	Impoundment area	Embankment	Irrigation
Fair----	Poor-------	Unsuitable-	Good.	Very deep; moderately rapid permeability; level to sloping; low shrink-swell potential.	Moderately rapid permeability; level to sloping.	Low to medium strength; low stability; slight to medium compressibility; subject to piping and cracking.	Rapid to very rapid intake; moderate available water holding capacity; very deep.
Fair----	Poor-------	Unsuitable-	Good.				
Fair----	Poor-------	Poor to unsuitable.	Good.				
Poor----	Good to fair.	Unsuitable-	Good-------	Very deep; rapid permeability; sloping to steep; low shrink-swell potential.	Rapid permeability; sloping to steep.	Low to high strength; low to moderate stability; very slight compressibility; subject to piping and cracking.	Very rapid intake; low available water holding capacity; deep; sloping to steep.
Poor----	Unsuitable-	Unsuitable-	Fair to poor.	Deep; slow permeability; level to strongly sloping; high shrink-swell potential.	Slow permeability; level to strongly sloping.	Low to medium strength; low to moderate stability; medium to high compressibility; subject to piping and cracking.	Moderate intake; moderate available water holding capacity; deep; level to strongly sloping.
Poor----	Unsuitable-	Unsuitable-	Fair to poor.				
Poor----	Unsuitable-	Unsuitable-	Fair to poor.				
Poor----	Unsuitable-	Poor-------	Fair.				
Poor----	Variable---	Variable---	Variable---	Variable---------	Unsuitable------	Variable-------	Unsuitable.
Poor----	Unsuitable-	Unsuitable-	Good to fair.	Shale at a depth of 4 to 18 inches; moderate permeability; sloping to steep; low shrink-swell potential.	Moderate permeability; sloping to steep; shale at a depth of 4 to 18 inches; 35 to 40 percent shale fragments.	Low to medium strength; variable stability; slight compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; shallow; sloping to steep.
Poor----	Unsuitable-	Unsuitable-	Good to fair.				
Poor----	Unsuitable-	Unsuitable-	Good to fair.	Shale at a depth of 4 to 18 inches; moderate permeability; steep; low shrink-swell potential.	Moderate permeability; steep; shale at a depth of 4 to 18 inches; 35 to 40 percent shale fragments.	Low to medium strength; variable stability; slight compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; shallow; steep.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
CbF2	Calleguas-Arnold complex (Continued)								
	Arnold	VIIs-4	J	A	Severe	Severe	Severe	Slight	Slight
Cc	Camarillo sandy loam	IIw-2	E	C	Severe	Severe	Severe	Slight	Severe
Cd	Camarillo loam	IIw-2	E	C	Severe	Severe	Severe	Slight	Severe
Ce	Camarillo loam, sandy substratum.	IIw-2	E	C	Severe	Severe	Severe	Slight	Severe
CfD2	Castaic-Balcom complex, 9 to 15 percent slopes, eroded:			1/					
	Castaic	IIIe-1	A	C	Severe	Moderate	Severe	Slight	Severe
	Balcom	IIIe-1	A	B	Severe	Moderate	Severe	Slight	Severe
CfE	Castaic-Balcom complex, 15 to 30 percent slopes:			1/					
	Castaic	IVe-1	A	C	Severe	Severe	Severe	Slight	Severe
	Balcom	IVe-1	A	B	Severe	Severe	Severe	Slight	Severe
CfF2	Castaic-Balcom complex, 30 to 50 percent slopes, eroded:			1/					
	Castaic	VIe-1	A	C	Severe	Severe	Severe	Slight	Severe
	Balcom	VIe-1	A	B	Severe	Severe	Severe	Slight	Severe
CfG2	Castaic-Balcom complex, 50 to 65 percent slopes, eroded:			1/					
	Castaic	VIIe-1	J	C	Severe	Severe	Severe	Slight	Severe
	Balcom	VIIe-1	J	B	Severe	Severe	Severe	Slight	Severe
CgG2	Castaic and Saugus soils, 30 to 75 percent slopes, eroded:			1/					1/
	Castaic	VIIe-1	J	C	Severe	Severe	Severe	Slight	Severe.

See footnotes at end of table.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
					Water retention structures		
Topsoil	Sand	Gravel	Road fill	Road location	Impoundment area	Embankment	Irrigation
Poor----	Good to fair.	Unsuitable-	Good------	Very deep; rapid permeability; steep; low shrink-swell potential.	Rapid permeability; steep.	Low to high strength; low to moderate stability; very slight compressibility; subject to piping and cracking.	Very rapid intake; low available water holding capacity; deep; steep.
Poor----	Poor to unsuitable.	Unsuitable-	Good to fair.	Very deep; moderate permeability; level; moderate shrink-swell potential; water table at a depth of 2 feet unless drained.	Moderate permeability.	Very low to medium strength; low stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; deep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair to good.				
Fair to poor.	Unsuitable-	Unsuitable-	Fair.	Soft shale at a depth of 22 to 40 inches; moderate and moderately slow permeability; sloping to very steep; moderate shrink-swell potential.	Moderate and moderately slow permeability; sloping to very steep; 22 to 40 inches deep.	Low to medium strength; low to moderate stability; medium compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; moderately deep; sloping to very steep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair------	Soft shale at a depth of 22 to 40 inches; moderately slow permeability; steep to very steep; moderate shrink-swell potential.	Moderately slow permeability; steep to very steep; 22 to 40 inches deep.	Low to medium strength; low to moderate stability; medium compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; moderately deep; steep to very steep.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
CgG2	Castaic and Saugus soils (Continued)								
	Saugus	VIIe-1	J	B	Severe	Severe	Severe	Slight	Moderate
ChD2	Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded.	IVe-3	J	D	Severe	Severe	Severe	Severe 2/	Very severe.
CkE3	Chesterton sandy loam, 9 to 30 percent slopes, severely eroded.	VIe-3	J	D	Severe	Severe	Severe	Severe 2/	Very severe.
CmD	Cibo clay, 5 to 15 percent slopes.	IIIe-5	C	D	Severe	Severe	Severe	Moderate	Severe
CmE	Cibo clay, 15 to 30 percent slopes.	IVe-5	C	D	Severe	Severe	Severe	Severe	Severe
CnB	Coastal beaches	VIIIw-4	J	A	Moderate	Severe	Severe	Slight	Very severe.
CoA	Corralitos loamy sand, 0 to 2 percent slopes.	IIIs-4	B	A	Moderate	Severe	Slight	Slight	Slight
CoC	Corralitos loamy sand, 2 to 9 percent slopes.	IIIs-4	B	A	Moderate	Severe	Moderate	Slight	Slight

See footnotes at end of table.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures: Impoundment area	Water retention structures: Embankment	Irrigation
Poor----	Poor-------	Unsuitable-	Good-------	Soft sandstone at a depth of 48 to 60 inches; moderate permeability; steep to very steep; low shrink-swell potential.	Moderate permeability; steep to very steep; soft sandstone at a depth of 48 to 60 inches.	Medium strength; low stability; slight to medium compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; deep; steep to very steep.
Poor----	Poor to unsuitable.	Unsuitable-	Good.	Hardpan at a depth of 8 to 32 inches; very slow permeability; sloping to moderately steep; high shrink-swell potential.	Very slow permeability; sloping to moderately steep; hardpan at a depth of 8 to 32 inches.	Low strength; low to moderate stability; very slight to medium compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; shallow to moderately deep; sloping to moderately steep.
Poor----	Poor to unsuitable.	Unsuitable-	Good.				
Poor----	Unsuitable-	Unsuitable-	Poor.	Hard rock at a depth of 24 to 54 inches; slow permeability; sloping to moderately steep; high shrink-swell potential.	Slow permeability; sloping to moderately steep.	Low strength; moderate stability; medium compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; moderately deep to deep; sloping to moderately steep.
Poor----	Unsuitable-	Unsuitable-	Poor.				
Poor----	Good-------	Poor to unsuitable.	Fair-------	Very deep; very rapid permeability; level to gently sloping; low shrink-swell potential; subject to wave action.	Very rapid permeability; level to gently sloping; subject to wave action.	High strength; moderate stability; very slight compressibility.	Very rapid intake; low available water holding capacity; deep.
Poor----	Fair--------	Unsuitable-	Good.	Very deep; very rapid permeability; level to sloping; low shrink-swell potential.	Very rapid permeability; level to sloping.	Low to medium strength; low to moderate stability; slight compressibility; subject to piping and cracking.	Very rapid intake; low available water holding capacity; very deep.
Poor----	Fair--------	Unsuitable-	Good.				

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
CrC	Cortina stony sandy loam, 2 to 9 percent slopes.	IVs-7	B	A	Severe----	Severe---	Moderate-	Severe-----	Slight---
CsD	Cortina very stony sandy loam, 9 to 15 percent slopes.	VIs-7	B	A	Severe----	Severe----	Severe----	Severe-----	Slight---
CyA	Cropley clay, 0 to 2 percent slopes.	IIs-5	C	D	Severe --	Severe----	Severe----	Slight-----	Severe---
CyC	Cropley clay, 2 to 9 percent slopes.	IIe-5	C	D	Severe----	Severe----	Severe----	Slight-----	Severe---
Cz	Cropley clay, calcareous variant.	IIw-5	C	D	Severe----	Severe----	Severe----	Slight-----	Severe---
DbD	Diablo clay, 9 to 15 percent slopes.	IIIe-5	C	D	Severe----	Severe----	Severe----	Slight-----	Severe---
DbE	Diablo clay, 15 to 30 percent slopes.	IVe-5	C	D	Severe----	Severe----	Severe----	Slight-----	Severe---
DbF	Diablo clay, 30 to 50 percent slopes.	VIe-5	C	D	Severe----	Severe----	Severe----	Slight-----	Severe---
Fd	Fill land----------	IVw-4	J	B	Moderate--	Moderate-	Severe----	Moderate--	Very severe.
GaA	Garretson loam, 0 to 2 percent slopes.	I-1	A	B	Slight----	Slight----	Slight----	Slight-----	Slight--
GaC	Garretson loam, 2 to 9 percent slopes.	IIe-1	A	B	Moderate--	Moderate--	Moderate--	Slight-----	Slight---
GbC	Garretson gravelly loam, 2 to 9 percent slopes.	IIe-1	A	B	Severe----	Moderate--	Moderate--	Slight-----	Slight---
GcB	Garretson silt loam, calcareous variant, 2 to 5 percent slopes.	IIe-1	A	B	Severe----	Moderate--	Moderate--	Slight-----	Slight---
GrF	Gaviota rocky sandy loam, 15 to 50 percent slopes.	VIIe-8	J	D	Severe----	Severe----	Severe----	Severe-----	Very severe.

See footnotes at end of table.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures		Irrigation
					Impoundment area	Embankment	
Poor---- Poor----	Poor------ Poor------	Poor------- Poor-------	Fair to good. Good.	Very deep; rapid permeability; gently to strongly sloping; low shrink-swell potential.	Rapid permeability; gently to strongly sloping; 35 to 75 percent coarse fragments.	Medium to high strength; low to high stability; very slight compressibility.	Very rapid intake; low available water holding capacity; very deep; gently to strongly sloping.
Poor---- Poor---- Poor----	Unsuitable- Unsuitable- Unsuitable-	Unsuitable- Unsuitable- Unsuitable-	Poor. Poor. Poor.	Very deep; slow permeability; level to sloping; high shrink-swell potential.	Slow permeability; level to sloping.	Low strength; low to moderate stability; medium compressibility; subject to piping and cracking.	Slow intake; moderate to high available water holding capacity; deep.
Poor---- Poor---- Poor----	Unsuitable- Unsuitable- Unsuitable-	Unsuitable Unsuitable- Unsuitable-	Poor. Poor. Poor.	Soft shale at a depth of 40 to 50 inches; slow permeability; sloping to steep; high shrink-swell potential.	Slow permeability; sloping to steep; soft shale at a depth of 40 to 50 inches.	Low strength; low stability; medium compressibility; subject to piping and cracking.	Slow intake; moderate to high available water holding capacity; deep; sloping to steep.
Variable-	Variable---	Variable---	Variable----	Variable---------	Variable-- - --	Variable-------	Variable.
Good---- Fair---- Fair---- Poor----	Unsuitable- Unsuitable- Unsuitable- Unsuitable-	Unsuitable- Unsuitable- Poor to unsuitable. Unsuitable-	Fair. Fair. Fair. Fair.	Very deep; moderate permeability; level to sloping; moderate shrink-swell potential.	Moderate permeability; level to sloping.	Low strength; low to moderate stability; medium compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; deep.
Poor----	Unsuitable-	Unsuitable-	Good--------	Firm sandstone at a depth of 8 to 14 inches; moderately rapid permeability; moderately steep to steep; low shrink-swell potential.	Moderately rapid permeability; moderately steep to steep; firm sandstone at a depth of 8 to 14 inches.	Medium strength; low stability; slight compressibility; subject to piping and cracking.	Rapid to very rapid intake; moderate available water holding capacity; shallow; moderately steep to steep.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
GsE	Gazos silty clay loam, 15 to 30 percent slopes.	IVe-1	A	C	Severe----	Severe----	Severe----	Severe-----	Moderate-
GsF	Gazos silty clay loam, 30 to 50 percent slopes.	VIe-1	A	C	Severe----	Severe----	Severe----	Severe-----	Moderate-
GsG	Gazos silty clay loam, 50 to 75 percent slopes.	VIIe-1	J	C	Severe----	Severe----	Severe----	Severe----	Moderate-
GtD	Gilroy clay loam, 9 to 15 percent slopes.	IVe-1	G	C	Severe----	Moderate--	Severe----	Severe-----	Severe---
GtE	Gilroy clay loam, 15 to 30 percent slopes.	IVe-1	G	C	Severe----	Severe----	Severe----	Severe----	Severe---
GvF	Gilroy very rocky clay loam, 15 to 50 percent slopes.	VIs-1	J	C	Severe----	Severe----	Severe----	Severe----	Severe---
GxG	Gullied land----------	VIIIe-1	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.
HaG	Hambright very rocky loam, 15 to 75 percent slopes.	VIIs-8	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.
HbF	Hambright rocky clay loam, 30 to 50 percent slopes.	VIIe-8	J	D	Severe----	Severe----	Severe----	Severe-----	Very severe.
Hm	Hueneme loamy sand, loamy substratum.	IIw-2	E	C	Severe----	Severe----	Severe----	Slight-----	Severe---
Hn	Hueneme sandy loam-------	IIw-2	E	C	Severe----	Severe----	Severe----	Slight-----	Severe---

See footnotes at end of table.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures: Impoundment area	Water retention structures: Embankment	Irrigation
Poor---- Poor---- Poor----	Unsuitable- Unsuitable- Unsuitable-	Unsuitable- Unsuitable Unsuitable-	Fair. Fair. Fair.	Firm shale at a depth of 24 to 46 inches; moderately slow permeability; strongly sloping to very steep; moderate shrink-swell potential.	Moderately slow permeability; strongly sloping to very steep; firm shale at depth of 24 to 46 inches; up to 50 percent coarse fragments.	Low strength; moderate stability; medium to high compressibility; subject to piping and cracking.	Slow to moderate intake; low to moderate available water holding capacity; moderately deep to deep; strongly sloping to very steep.
Fair---- Poor---- Poor----	Unsuitable- Unsuitable- Unsuitable-	Unsuitable- Unsuitable- Unsuitable-	Fair. Fair. Fair.	Fractured hard rock at a depth of 24 to 40 inches; moderately slow permeability; sloping to steep; moderate shrink-swell potential.	Moderately slow permeability; sloping to steep; fractured hard rock at a depth of 24 to 40 inches.	Very low strength; moderate stability; moderate to high compressibility; subject to piping and cracking.	Slow to moderate intake; low to moderate available water holding capacity; moderately deep; sloping to steep.
Variable-	Variable--	Variable--	Variable----	Variable---------	Unsuitable-----	Variable-------	Unsuitable.
Poor---- Poor----	Unsuitable- Unsuitable-	Unsuitable- Unsuitable-	Fair. Fair.	Hard rock at a depth of 6 to 19 inches; moderate permeability; moderately steep to very steep; moderate shrink-swell potential.	Moderate permeability; moderately steep to very steep; hard rock at a depth of 6 to 19 inches; up to 25 percent rock outcrop.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; low available water holding capacity; shallow; moderately steep to very steep.
Poor---- Poor----	Poor---- Poor----	Unsuitable- Unsuitable-	Good. Good.	Very deep; moderate to moderately rapid permeability; level; low shrink-swell potential; water table at a depth of 2 1/2 feet unless drained.	Moderate to moderately rapid permeability; level.	Medium strength; low stability; slight compressibility; subject to piping and cracking.	Moderate to very rapid intake; low to moderate available water holding capacity; deep.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
HuB	Huerhuero very fine sandy loam, 0 to 5 percent slopes	IIIe-3	D	D	Severe----	Severe----	Severe----	Slight----	Very severe.
HuC2	Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded.	IVe-3	D	D	Severe----	Severe----	Severe----	Slight----	Very severe.
HuD2	Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded.	IVe-3	D	D	Severe----	Severe----	Severe----	Slight----	Very severe.
HuE3	Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded.	VIIe-3	J	D	Severe----	Severe----	Severe----	Slight----	Very severe.
IrG	Igneous rock land----------	VIIIs-1	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.
KmC2	Kimball sandy loam, 2 to 9 percent slopes, eroded.	IIIe-3	D	C	Severe----	Severe----	Severe----	Slight----	Severe---
KmD2	Kimball sandy loam, 9 to 15 percent slopes, eroded.	IVe-3	D	C	Severe----	Severe----	Severe----	Slight----	Severe---
LaF	Landslides----------	VIIe-1	J	C	Severe----	Severe----	Severe----	Slight----	Very severe.
LeD2	Linne silty clay loam, 9 to 15 percent slopes, eroded.	IIIe-1	A	C	Severe----	Moderate--	Severe----	Slight----	Severe -
LeE2	Linne silty clay loam, 15 to 30 percent slopes, eroded.	IVe-1	A	C	Severe----	Severe----	Severe----	Slight----	Severe---
LeF2	Linne silty clay loam, 30 to 50 percent slopes, eroded.	VIe-1	G	C	Severe----	Severe----	Severe----	Slight----	Severe---
LkF	Lodo rocky loam, 30 to 50 percent slopes.	VIIe-8	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.

See footnotes at end of table.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
					Water Retention structures		
Topsoil	Sand	Gravel	Road fill	Road location	Impoundment area	Embankment	Irrigation
Fair----	Unsuitable-	Unsuitable	Fair.	Claypan at a depth of 8 to 30 inches; very slow permeability; level to moderately steep; moderate shrink-swell potential.	Very slow permeability; level to moderately steep; claypan at a depth of 8 to 30 inches.	Low strength; variable stability; variable compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; shallow to moderately deep; level to moderately steep.
Fair to poor.	Unsuitable-	Unsuitable	Fair.				
Fair to poor.	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Variable.	Variable---	Variable---	Variable---	Variable----------	Unsuitable------	Variable----------	Unsuitable.
Fair----	Poor to unsuitable.	Unsuitable	Fair.	Very deep; slow permeability; gently to strongly sloping; moderate shrink-swell potential; subsoil stony or cobbly in places.	Slow permeability; gently to strongly sloping.	Variable strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; deep; gently to strongly sloping.
Fair----	Poor to unsuitable.	Unsuitable-	Fair.				
Variable.	Variable---	Variable---	Variable---	Unsuitable- -----	Unsuitable------	Variable---------	Variable.
Poor----	Unsuitable-	Unsuitable-	Fair.	Soft shale at a depth of 24 to 48 inches; moderately slow permeability; sloping to steep; moderate shrink-swell potential.	Moderately slow permeability; sloping to steep; soft shale at a depth of 24 to 48 inches.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; moderate to high available water holding capacity; moderately deep; sloping to steep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair - ----	Hard shale at a depth of 8 to 20 inches; moderate permeability; steep; moderate shrink-swell potential.	Moderate permeability; steep; hard shale at a depth of 8 to 20 inches; 2 to 10 percent rock outcrop.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; low available water holding capacity; shallow; steep.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
LoD2	Los Osos clay loam, 9 to 15 percent slopes, eroded.	IIIe-1	G	C	Severe----	Severe----	Severe----	Moderate---	Severe---
LoE2	Los Osos clay loam, 15 to 30 percent slopes, eroded.	IVe-1	G	C	Severe----	Severe----	Severe----	Moderate---	Severe---
LoF	Los Osos clay loam, 30 to 50 percent slopes.	VIe-1	G	C	Severe----	Severe----	Severe----	Moderate--	Severe---
MaD2	Malibu loam, 9 to 15 percent slopes, eroded.	IVe-3	D	D	Severe----	Severe----	Severe----	Severe----	Very severe.
MaE2	Malibu loam, 15 to 30 percent slopes, eroded.	VIe-3	D	D	Severe----	Severe----	Severe----	Severe----	Very severe.
MaF	Malibu loam, 30 to 50 percent slopes.	VIIe-3	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.
McA	Metz loamy fine sand, 0 to 2 percent slopes.	IIs-4	B	A	Moderate--	Moderate--	Slight----	Slight----	Slight---
McC	Metz loamy fine sand, 2 to 9 percent slopes.	IIs-4	B	A	Moderate--	Moderate--	Moderate--	Slight----	Slight---
MeA	Metz loamy sand, 0 to 2 percent slopes.	IIIs-4	B	A	Moderate--	Moderate--	Slight----	Slight----	Slight---
MeC	Metz loamy sand, 2 to 9 percent slopes.	IIIs-4	B	A	Moderate--	Moderate--	Moderate--	Slight----	Slight---
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes.	IIs-4	B	B	Moderate--	Moderate--	Slight----	Slight----	Slight---
MhF	Millsholm loam, 15 to 50 percent slopes.	VIIe-8	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.
MkG	Millsholm very rocky loam, 30 to 75 percent slopes.	VIIs-8	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.

See footnotes at end of table.

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures		Irrigation
					Impoundment area	Embankment	
Poor---- Poor---- Poor----	Unsuitable- Unsuitable- Unsuitable-	Unsuitable- Unsuitable- Unsuitable	Poor. Poor. Poor.	Hard shale at a depth of 22 to 48 inches; slow permeability; sloping to steep; high shrink-swell potential.	Slow permeability; sloping to steep; hard shale at a depth of 22 to 48 inches.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; moderately deep to deep; sloping to steep.
Fair to poor. Poor---- Poor----	Unsuitable- Unsuitable- Unsuitable-	Unsuitable- Unsuitable- Unsuitable-	Fair to poor. Fair to poor. Fair to poor.	Hard shale at a depth of 23 to 36 inches; very slow permeability; sloping to steep; high shrink-swell potential.	Very slow permeability; sloping to steep; hard shale at a depth of 23 to 36 inches.	Low strength; low to moderate stability; medium to high compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; moderately deep; sloping to steep.
Poor---- Poor---- Poor---- Poor---- Poor----	Fair to good. Fair to good. Fair to good. Fair to good. Fair to good.	Unsuitable- Unsuitable- Unsuitable- Unsuitable- Unsuitable-	Good. Good. Good. Good. Good.	Very deep; rapid to moderately rapid permeability; level to sloping; low shrink swell potential.	Rapid to moderately rapid permeability; level to sloping.	Medium to high strength; low to moderate stability; slight to medium compressibility.	Very rapid intake; moderate available water holding capacity; deep.
Poor---- Poor----	Unsuitable- Unsuitable-	Unsuitable- Unsuitable-	Fair. Fair.	Hard shale at a depth of 10 to 20 inches; moderately slow permeability; moderately steep to very steep; moderate shrink-swell potential.	Moderately slow permeability; moderately steep to very steep; hard shale at a depth of 10 to 20 inches; 10 to 25 percent rock outcrops.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; low available water holding capacity; shallow; steep to very steep.

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Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
MmF2	Millsholm-Malibu complex, 30 to 50 percent slopes, eroded:								
	Millsholm----------	VIIe-8	J	D	Severe----	Severe----	Severe----	Severe-----	Very severe.
	Malibu----------	VIIe-3	J	D	Severe----	Severe----	Severe----	Severe-----	Very severe.
MoA	Mocho loam, 0 to 2 percent slopes.	I-1	A	B	Slight----	Slight----	Moderate--	Slight-----	Slight---
MoC	Mocho loam, 2 to 9 percent slopes.	IIe-1	A	B	Severe----	Moderate--	Moderate--	Slight-----	Slight---
MrC	Mocho gravelly loam, 2 to 9 percent slopes.	IIe-1	A	B	Severe----	Moderate--	Moderate--	Slight----	Slight---
MsA	Mocho clay loam, 0 to 2 percent slopes.	I-1	A	C	Moderate--	Moderate--	Severe----	Slight-----	Moderate-
MsB	Mocho clay loam, 2 to 5 percent slopes.	IIe-1	A	C	Moderate--	Moderate--	Severe----	Slight-----	Moderate-
NaD2	Nacimiento silty clay loam, 9 to 15 percent slopes, eroded.	IIIe-1	A	C	Severe----	Moderate--	Severe----	Slight----	Severe---
NaE2	Nacimiento silty clay loam, 15 to 30 percent slopes, eroded.	IVe-1	A	C	Severe----	Severe----	Severe----	Slight-----	Severe---
NaF	Nacimiento silty clay loam, 30 to 50 percent slopes.	VIe-1	A	C	Severe----	Severe----	Severe----	Slight-----	Severe---
NaG	Nacimiento silty clay loam, 50 to 75 percent slopes.	VIIe-1	J	C	Severe----	Severe----	Severe----	Slight-----	Severe---
OhA	Ojai very fine sandy loam, 0 to 2 percent slopes.	IIs-1	A	C	Moderate--	Moderate--	Severe----	Severe-----	Moderate-
OhC2	Ojai very fine sandy loam, 2 to 9 percent slopes, eroded.	IIIe-1	A	C	Moderate--	Moderate--	Severe----	Severe----	Moderate-
OhD2	Ojai very fine sandy loam, 9 to 15 percent slopes, eroded.	IVe-1	A	C	Severe----	Moderate--	Severe----	Severe-----	Moderate-
OsD2	Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded.	IVe-7	A	C	Severe----	Moderate--	Severe----	Severe-----	Moderate-
OsE2	Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded.	VIe-7	B	C	Severe----	Severe----	Severe----	Severe-----	Moderate-

See footnotes at end of table.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
					Water retention structures		
Topsoil	Sand	Gravel	Road fill	Road location	Impoundment area	Embankment	Irrigation
Poor----	Unsuitable-	Unsuitable-	Fair------	Hard shale at a depth of 10 to 20 inches; moderately slow permeability; steep; moderate shrink-swell potential.	Moderately slow permeability; steep; hard shale at a depth of 10 to 20 inches.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; low available water holding capacity; shallow; steep.
Poor----	Unsuitable-	Unsuitable-	Fair to poor.	Hard shale at a depth of 23 to 36 inches; very slow permeability; steep; high shrink-potential.	Very slow permeability; steep; hard shale at a depth of 23 to 36 inches.	Low strength; low to moderate stability; medium to high compressibility; subject to piping and cracking.	Slow intake; moderate available water holding capacity; moderately deep; steep.
Poor----	Unsuitable-	Unsuitable-	Fair.	Very deep; moderate and moderately slow permeability; level to sloping; moderate shrink-swell potential.	Moderate and moderately slow permeability; level to sloping.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Moderate to slow intake; moderate to high available water holding capacity; deep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.	Firm shale at a depth of 24 to 40 inches; moderately slow permeability; sloping to very steep; moderate shrink-swell potential.	Moderately slow permeability; sloping to very steep; firm shale at a depth of 24 to 40 inches.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; moderate available water holding capacity; moderately steep to very steep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Fair----	Unsuitable-	Fair------	Fair to good.	Very deep; moderately slow permeability; level to moderately steep; moderate shrink-swell potential.	Moderately slow permeability; level to moderately steep; 15 to 75 percent stones and cobblestones.	Low to medium strength; variable stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; moderate available water holding capacity; level to moderately steep.
Fair----	Unsuitable-	Fair------	Fair to good.				
Fair----	Unsuitable-	Fair------	Fair to good.				
Poor----	Poor to fair.	Poor to fair.	Good.				
Poor----	Poor to fair.	Poor to fair.	Good.				

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
Pa	Pacheco silty clay loam-----	IIw-2	E	C	Severe----	Severe----	Severe----	Slight-----	Severe---
PeA	Pico sandy loam, 0 to 2 percent slopes.	IIs-4	A	B	Slight----	Slight----	Slight----	Slight-----	Slight---
PcC	Pico sandy loam, 2 to 9 percent slopes.	IIe-1	A	B	Moderate--	Moderate--	Moderate--	Slight-----	Slight---
PsA	Pico loam, sandy substratum, 0 to 2 percent slopes.	IIIs-0	B	B	Slight----	Moderate--	Slight----	Slight-----	Slight---
PxG	Pits and dumps----------	VIIIs-1	J	C	Severe ---	Moderate-	Severe-- -	Severe----	Severe---
RcC	Rincon silty clay loam, 2 to 9 percent slopes.	IIe-3	D	D	Severe----	Severe----	Severe----	Slight-----	Severe---
RcD2	Rincon silty clay loam, 9 to 15 percent slopes, eroded.	IIIe-3	D	D	Severe----	Severe----	Severe----	Slight-----	Severe---
RcE2	Rincon silty clay loam, 15 to 30 percent slopes, eroded.	IVe-3	D	D	Severe----	Severe----	Severe----	Slight-----	Severe---
RcE3	Rincon silty clay loam, 9 to 30 percent slopes, severely eroded.	VIe-3	D	D	Severe----	Severe----	Severe----	Slight-----	Severe---
Rw	Riverwash----------	VIIIw-4	J	A	Severe----	Severe----	Severe----	Severe-----	Slight---
SaA	Salinas clay loam, 0 to 2 percent slopes.	I-1	A	C	Moderate--	Moderate--	Severe----	Slight-----	Moderate-
SaC	Salinas clay loam, 2 to 9 percent slopes.	IIe-1	A	C	Moderate--	Moderate--	Severe----	Slight-----	Moderate-
SbF	San Andreas sandy loam, 30 to 50 percent slopes.	VIIe-1	J	B	Severe----	Severe----	Severe----	Slight-----	Slight---

See footnotes at end of table.

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures: Impoundment area	Water retention structures: Embankment	Irrigation
Poor----	Unsuitable-	Unsuitable-	Fair-------	Very deep; moderately slow permeability; level; moderate shrink-swell potential; water table at a depth of 2 to 3 feet unless drained.	Moderately slow permeability; level.	Low strength; low stability; slight to medium compressibility; subject to piping and cracking.	Slow to moderate intake; high available water holding capacity; deep.
Poor----	Fair-------	Unsuitable-	Good.	Very deep; moderately rapid to moderate permeability; level to sloping; low shrink-swell potential.	Moderately rapid to moderate permeability; level to sloping.	Variable strength; low to medium stability; variable compressibility; subject to piping and cracking.	Moderate to very rapid intake; low to high available water holding capacity; deep.
Poor----	Fair-------	Unsuitable-	Good.				
Poor----	Good-------	Unsuitable-	Good.				
Variable.	Variable---	Variable --	Variable---	Variable---------	Variable-------	Unsuitable-----	Variable.
Fair to poor.	Unsuitable-	Unsuitable-	Fair.	Very deep; slow permeability; gently sloping to moderately steep; high shrink-swell potential.	Slow permeability; gently sloping to moderately steep.	Low strength; variable stability; variable compressibility; subject to piping and cracking.	Slow intake; moderate to high available water holding capacity; deep; gently sloping to moderately steep.
Fair to poor.	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Good------	Good------	Good-------	Unsuitable-------	Unsuitable------	Variable-------	Variable.
Fair to poor.	Unsuitable-	Unsuitable-	Fair.	Very deep; moderately slow permeability; level to sloping; moderate shrink-swell potential.	Moderately slow permeability; level to sloping.	Low strength; low stability; slight to medium compressibility; subject to piping and cracking.	Slow to moderate intake; moderate to high available water holding capacity; deep.
Fair to poor.	Unsuitable-	Unsuitable-	Fair.				
Poor----	Fair------	Unsuitable-	Good-------	Very deep; moderate permeability; steep; low shrink-swell potential.	Moderate permeability; steep.	Medium strength; low stability; slight to medium compressibility; subject to piping and cracking.	Moderate to rapid intake; low to moderate available water holding capacity; deep; steep.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
ScD2	San Benito clay loam, 9 to 15 percent slopes, eroded.	IIIe-1	A	C	Severe----	Moderate--	Severe----	Slight----	Moderate-
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded.	IVe-1	A	C	Severe----	Severe----	Severe----	Slight----	Moderate-
ScF2	San Benito clay loam, 30 to 50 percent slopes, eroded.	VIe-1	A	C	Severe----	Severe----	Severe----	Slight----	Moderate-
ScG	San Benito clay loam, 50 to 75 percent slopes.	VIIe-1	J	C	Severe----	Severe----	Severe----	Slight----	Moderate-
Sd	Sandy alluvial land---------	IVw-4	B	A	Moderate--	Moderate--	Moderate--	Moderate--	Slight---
SeE	Santa Lucia shaly silty clay loam, 15 to 30 percent slopes.	IVe-1	G	C	Severe----	Severe----	Severe----	Severe----	Severe---
SeF	Santa Lucia shaly silty clay loam, 30 to 50 percent slopes.	VIe-1	G	C	Severe----	Severe----	Severe----	Severe----	Severe---
SeG	Santa Lucia shaly silty clay loam, 50 to 75 percent slopes.	VIIe-1	J	C	Severe----	Severe----	Severe----	Severe----	Severe---
ShE	Saugus sandy loam, 5 to 30 percent slopes.	VIe-1	A	B	Severe----	Severe----	Severe----	Slight----	Moderate-
ShF2	Saugus sandy loam, 30 to 50 percent slopes, eroded.	VIIe-1	J	B	Severe----	Severe----	Severe----	Slight----	Moderate-
SnG	Sedimentary rock land-------	VIIIs-1	J	D	Severe----	Severe----	Severe----	Severe----	Very severe.

See footnotes at end of table.

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures: Impoundment area	Water retention structures: Embankment	Irrigation
Fair to poor.	Unsuitable-	Unsuitable-	Fair.	Soft shale at a depth of 45 to 60 inches; moderately slow permeability; sloping to very steep; moderate shrink-swell potential.	Moderately slow permeability; sloping to very steep; soft shale at a depth of 45 to 60 inches.	Low to medium strength; low stability; slight to medium compressibility; subject to piping and cracking.	Slow to moderate intake; high available water holding capacity; deep; sloping to very steep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Fair to poor.	Fair-------	Unsuitable-	Good-------	Very deep; very rapid permeability; nearly level; low shrink-swell potential; infrequent overflow.	Very rapid permeability; nearly level.	Medium strength; low stability; slight to medium compressibility; subject to piping and cracking.	Very rapid intake; low to moderate available water holding capacity; deep.
Poor----	Unsuitable-	Unsuitable-	Fair.	Hard shale at a depth of 20 to 36 inches; moderate permeability; moderately steep to very steep; low shrink-swell potential.	Moderate permeability; moderately steep to very steep; hard shale at a depth of 20 to 36 inches; 15 to 50 percent shale fragments.	Low strength; moderate stability; medium to high compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; moderately deep; moderately steep to very steep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Poor-------	Unsuitable-	Good.	Soft sandstone at a depth of 48 to 60 inches; moderate permeability; gently sloping to steep; low shrink-swell potential.	Moderate permeability; gently sloping to steep; soft sandstone at a depth of 48 to 60 inches.	Medium strength; low stability; slight to medium compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate available water holding capacity; deep; gently sloping to steep.
Poor----	Poor-------	Unsuitable-	Good.				
Poor----	Variable---	Variable---	Variable---	Variable----------	Unsuitable------	Variable--------	Unsuitable.

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
SoE2	Sespe clay loam, 15 to 30 percent slopes, eroded.	IVe-1	G	C	Severe----	Severe----	Severe----	Severe----	Severe---
SoF	Sespe clay loam, 30 to 50 percent slopes.	VIe-1	G	C	Severe----	Severe----	Severe----	Severe----	Severe---
SoG	Sespe clay loam, 50 to 75 percent slopes.	VIIe-1	J	C	Severe----	Severe----	Severe----	Severe----	Severe---
SsE2	Soper loam, 15 to 30 percent slopes, eroded.	VIe-1	G	C	Severe----	Severe----	Severe----	Severe----	Moderate-
SvF2	Soper gravelly loam, 30 to 50 percent slopes, eroded.	VIIe-1	J	C	Severe----	Severe----	Severe----	Severe----	Moderate
SwA	Sorrento loam, 0 to 2 percent slopes.	I-1	A	B	Slight----	Slight----	Moderate--	Slight----	Slight---
SwC	Sorrento loam, 2 to 9 percent slopes.	IIe-1	A	B	Moderate--	Moderate--	Moderate--	Slight----	Slight---
SxA	Sorrento silty clay loam, 0 to 2 percent slopes.	I-1	A	C	Moderate--	Moderate--	Severe----	Slight----	Slight---
SxC	Sorrento silty clay loam, 2 to 9 percent slopes.	IIe-1	A	C	Moderate--	Moderate--	Severe----	Slight----	Slight---
SzC	Sorrento clay loam, heavy variant, 2 to 9 percent slopes.	IIe-1	A	C	Moderate--	Moderate--	Severe----	Slight----	Moderate-
SzD	Sorrento clay loam, heavy variant, 9 to 15 percent slopes.	IIIe-1	A	C	Severe----	Moderate--	Severe----	Slight----	Moderate-

See footnotes at end of table.

Suitability as a source of--				Soil features affecting--			
					Water retention structures		
Topsoil	Sand	Gravel	Road fill	Road location	Impoundment area	Embankment	Irrigation
Poor----	Unsuitable-	Unsuitable-	Fair.	Hard sandstone at a depth of 24 to 40 inches; slow permeability; moderately steep to very steep; moderate shrink-swell potential.	Slow permeability; moderately steep to very steep; hard sandstone at a depth of 24 to 40 inches.	Low to medium strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow intake; moderate to high available water holding capacity; moderately deep; moderately steep to very steep.
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Unsuitable-	Unsuitable-	Fair.				
Poor----	Poor-------	Poor-------	Good.	Weakly cemented conglomerate at a depth of 24 to 58 inches; moderately slow permeability; moderately steep to steep; moderate shrink-swell potential.	Moderately slow permeability; moderately steep to steep; weakly cemented conglomerate at a depth of 24 to 58 inches; 15 to 50 percent coarse fragments.	Low strength; variable stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; low to moderate available water holding capacity; moderately deep to deep; moderately steep to steep.
Poor----	Poor-------	Poor-------	Good.				
Good----	Unsuitable-	Unsuitable-	Fair-------	Very deep; moderate permeability; level to nearly level; moderate shrink-swell potential.	Moderate permeability; level to nearly level.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate to high available water holding capacity; deep.
Fair----	Unsuitable-	Unsuitable-	Fair.	Very deep; moderate to moderately slow permeability; level to sloping; moderate shrink-swell potential.	Moderate to moderately slow permeability; level to sloping.	Low strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate to high available water holding capacity; deep.
Fair----	Unsuitable-	Unsuitable-	Fair.				
Fair----	Unsuitable-	Unsuitable-	Fair.				
Fair to poor.	Unsuitable-	Unsuitable-	Poor.	Very deep; slow permeability; gently to strongly sloping; high shrink-swell potential.	Slow permeability; gently to strongly sloping.	Very low to medium strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Slow to moderate intake; high available water holding capacity; deep; gently to strongly sloping.
Fair to poor.	Unsuitable-	Unsuitable-	Poor.				

Map symbol	Soil	Capability unit	Vegetative soil group	Hydrologic soil group	Degree of limitation for--				Avocado root rot hazard
					Play areas (intensive use)	Golf fairways and lawns	Septic tank filter fields	Excavations	
TeF	Terrace escarpments--------	VIIe 1	J	C	Severe----	Severe----	Severe----	Moderate---	Very severe.
Ts	Tidal flats----------	VIIIw-6	J	D	Severe----	Severe----	Severe----	Slight-----	Very severe.
VaA	Vina loam, 0 to 2 percent slopes.	I-1	A	B	Slight----	Slight----	Slight----	Slight-----	Slight---
VaC	Vina loam, 2 to 9 percent slopes.	IIe-1	A	B	Moderate--	Moderate--	Moderate--	Slight-----	Slight---
VnC	Vina gravelly loam, 2 to 9 percent slopes.	IIe-1	A	B	Severe----	Moderate--	Moderate--	Slight-----	Slight---
VsC	Vina silty clay loam, 2 9 percent slopes.	IIe-1	A	C	Moderate--	Moderate--	Severe----	Slight-----	Slight---
ZmC	Zamora loam, 2 to 9 percent slopes.	IIe-1	A	C	Moderate--	Moderate--	Severe----	Slight-----	Slight---
ZmD2	Zamora loam, 9 to 15 percent slopes, eroded.	IIIe-1	A	C	Severe----	Moderate--	Severe----	Slight-----	Slight---

1/ Use this rating for mapping unit if making a single-purpose map.

INTERPRETATIONS--Continued

Suitability as a source of--				Soil features affecting--			
Topsoil	Sand	Gravel	Road fill	Road location	Water retention structures		Irrigation
					Impoundment area	Embankment	
Variable.	Variable---	Variable---	Variable---	Variable---------	Unsuitable------	Variable-------	Variable.
Variable.	Variable---	Variable---	Variable---	Unsuitable-------	Variable--------	Unsuitable-----	Variable.
Fair----	Unsuitable-	Unsuitable-	Fair.	Very deep; moderate to moderately slow permeability; level to sloping; moderate shrink-swell potential.	Moderate to moderately slow permeability; level to sloping; up to 25 percent gravel.	Low strength; variable stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate to high available water holding capacity; deep.
Fair----	Unsuitable-	Unsuitable-	Fair.				
Fair----	Poor-------	Unsuitable-	Fair.				
Fair----	Unsuitable-	Unsuitable-	Fair.				
Fair to poor.	Unsuitable-	Unsuitable-	Fair.	Very deep; moderately slow permeability; gently to strongly sloping; moderate shrink-swell potential.	Moderately slow permeability; gently to strongly sloping.	Low to medium strength; low to moderate stability; variable compressibility; subject to piping and cracking.	Moderate to rapid intake; moderate to high available water holding capacity; deep; gently to strongly sloping.
Fair to poor.	Unsuitable-	Unsuitable-	Fair.				

2/ Silica-cemented hardpan at a depth of 8 to 32 inches.

ity is more than 5 inches for total profile. Conductivity of saturation extract is less than 4 millimhos per centimeter. Percentage of exchangeable sodium in uppermost 20 inches of soil material is less than 15.

Moderate. Soil has one or more of the following features: Slope is 2 to 15 percent. Texture of surface layer is loamy sand, silty clay loam, gravelly fine sandy loam, gravelly very fine sandy loam, gravelly loam, gravelly silt loam, gravelly clay loam, gravelly silty clay loam, silty clay, or clay. Surface is less than 3 percent covered by stones, cobblestones, and rocks. Depth to hardpan, hard bedrock, or seasonal water table is between 20 and 40 inches. Natural drainage is somewhat excessive or somewhat poor. Permeability is rapid or moderately slow in subsoil. Available water holding capacity for entire profile is between 3.8 and 5 inches. Conductivity of saturation extract is between 4 and 8 millimhos per centimeter. Percentage of exchangeable sodium in uppermost 20 inches of soil material is more than 15.

Severe. Soil has one or more of the following features: Slope is more than 15 percent. Texture of surface layer is sand, gravelly sand, gravelly loamy sand, gravelly clay, or any gravelly material. Surface is more than 3 percent covered by stones, cobblestones, and rocks. Depth to hardpan, hard bedrock, or seasonal water table is less than 20 inches. Natural drainage is excessive, poor, or very poor. Permeability is very rapid or very slow in subsoil. Available water holding capacity for profile is less than 3.8 inches. Conductivity of saturation extract is more than 8 millimhos per centimeter. Percentage of exchangeable sodium for uppermost 20 inches of soil material is more than 15.

Septic tank filter fields.--Filter fields for septic tanks are fairly large areas in which subsurface tile is laid in such a way that effluent from the septic tank is distributed uniformly into the soil. It is assumed that the minimum depth of soil material over the tile lines is 12 inches, and that the minimum diameter of the lines is 4 inches. It is also assumed that the minimum depth of the filter material over the lines is 2 inches and that the minimum depth under the lines is 12 inches.

The degree of limitation given in table 4 is based on soil properties. Coarse-textured material, for example, may allow contamination of ground water supplies. Sodium salts from water softeners and other sources tends to disperse the clay in the soil and reduces the effectiveness of the filter field. Among the criteria considered in determining the degree of limitation are the frequency and duration of overflow. Percolation rates may be used as part of the criteria, but no records of rates were made in this Area. The degrees of limitation are defined as follows.

Slight. Soil has all of the following features: Permeability is more than 1 inch per hour. Depth to seasonal water table is more than 4 feet. Drainage is excessive, somewhat excessive, or good. Depth to hardpan, impervious bedrock, or permanent water table is more than 6 feet. Slope is less than 5 percent.

Moderate. Soil has one or more of the following features: Permeability is 1 to 0.63 inch per hour. Depth to seasonal water table is between 2 and 4 feet. Drainage is moderately good or somewhat poor. Depth to hardpan, impervious bedrock, or permanent water table is between 4 and 6 feet. Slope is 5 to 9 percent.

Severe. Soil has one or more of the following features: Permeability is less than 0.63 inch per hour. Depth to seasonal water table is less than 2 feet. Drainage is poor or very poor. Depth to hardpan, impervious bedrock, or permanent water table is less than 4 feet. Slope is more than 9 percent.

Excavations.--The presence of cobblestones, stones, or rock, or a water table within a depth of 5 feet hinders excavation of the soils for pipelines, roads, channels, or other engineering structures. Soft or weathered rock can be excavated easily by means of commonly used earthmoving equipment. The presence of gravel, in any amount, does not affect the ease of excavation.

The degrees of limitation shown in table 4 are defined as follows.

Slight. Soil has all of the following features: Surface is less than 2 percent exposed rock. Soil is less than 3 percent stones or cobblestones throughout profile. Depth to hardpan or hard bedrock is more than 60 inches.

Moderate. Soil has one or more of the following features: Surface is 2 to 10 percent exposed rock. Soil is 3 to 15 percent stones or cobblestones throughout profile. Depth to hardpan or hard bedrock is between 36 and 60 inches.

Severe. Soil has one or more of the following features: Surface is more than 10 percent exposed rock. Soil is 15 percent stones or cobblestones throughout profile. Depth to hardpan or hard bedrock is less than 36 inches.

Avocado root rot.--Studies show a definite correlation between kinds of soil and the incidence of avocado root rot caused by the fungus Phytophtora cinnamoni. The hazard of avocado root rot is directly related to drainage and permeability. Permeability, in turn, is strongly influenced by texture and by the percentage of exchangeable sodium in the subsoil. Careful control of irrigation practices is essential to avoid creating a perched water table.

The degrees of hazard shown in table 4 are based on soil properties. Limitations resulting from

climate are not considered. The most severely limiting property or quality of the soil determines the degree of hazard. The degrees are defined as follows.

Slight. Soil has all of the following features: Drainage is excessive, somewhat excessive, or good. Permeability is very rapid, rapid, moderately rapid, or moderate (more than 0.63 inch per hour) in subsoil. Depth to hardpan or impermeable bedrock is more than 60 inches. Percentage of exangeable sodium is less than 2.

Moderate. Soil has one or more of the following features: Drainage is moderately good. Permeability is moderately slow (0.63 to 0.20 inch per hour) in subsoil. Depth to hardpan or impermeable bedrock is between 36 and 60 inches. Percentage of exchangeable sodium is between 2 and 5.

Severe. Soil has one or more of the following features: Drainage is somewhat poor or poor. Permeability is slow (0.06 to 0.20 inch per hour) in subsoil. Depth to hardpan or impermeable bedrock is between 20 and 36 inches. Percentage of exchangeable sodium is between 5 and 15.

Very severe. Soil has one or more of the following features: Drainage is very poor. Permeability is very slow (less than 0.06 inch per hour) in subsoil. Depth to hardpan or impermeable bedrock is less than 20 inches. Percentage of exchangeable sodium is more than 15.

The map "Soil Limitations for Avocado Root Rot" is a sheet of the detailed soil map colored to show the slight, moderate, severe, or very severe hazard of avocado root rot of the soils in one given locality.

Topsoil.--Soil as a source of topsoil is of interest to nurserymen, landscape architects, highway engineers, and others concerned with establishing vegetation on slopes, road shoulders, waterways, lawns, golf courses, and wherever else needed.

Factors considered in evaluation of a potential source of topsoil are soil texture, content of gravel and cobblestones, salinity, reaction, inherent fertility, drainage, thickness, slope, and topography. The distance from the area of intended use and the presence of weeds, soil-borne diseases, and insects are not considered. The suitability ratings shown in table 4 are defined as follows.

Good. Soil has all of the following features: Texture is loam, silt loam, or fine sandy loam. Gravel content is less than 15 percent. Salinity of saturation extract is less than 2 millimhos per centimeter. Reaction is 6.1 to 7.3. Inherent fertility is very high and high. Natural drainage is good. Thickness of material is more than 40 inches. Slope is less than 2 percent.

Fair. Soil has one or more of the following features: Texture is silty clay loam, sandy clay loam, clay, or sandy loam. Gravel content is 15 to 50 percent, and cobblestones less than 15 percent. Salinity of saturation extract is 2 to 4 millimhos per centimeter. Reaction is 5.1 to 6.0, or 7.4 to 7.8. Inherent fertility is moderate. Natural drainage is somewhat excessive or moderately good. Thickness of material is 20 to 40 inches. Slope is 2 to 15 percent.

Poor. Soil has one or more of the following features: Texture is clay, loamy sand, or sand. Content of gravel is more than 50 percent, and that of cobblestones more than 15 percent. Salinity of saturation extract is more than 4 millimhos per centimeter. Reaction is less than 5 or more than 7.9. Inherent fertility is low and very low. Natural drainage is excessive, somewhat poor, poor, and very poor. Thickness of material is less than 20 inches. Slope is more than 15 percent.

Sand.--Soil is rated as a source of construction material for use in concrete, plaster, mortar, and similar mixtures. Accessibility of the source, gradation and mineral quality of the sand particles, and depth to the water table are not considered. Each distinct major soil horizon was evaluated separately.

The suitability ratings shown in table 4 are defined as follows.

Good. Soil has all of the following features: Texture is sand. Depth of overburden is 0 to 20 inches. Thickness of material is more than 5 feet. Material passing No. 200 sieve is 0 to 10 percent.

Fair. Soil has one or more of the following features: Texture is loamy sand. Depth of overburden is 20 to 40 inches. Thickness of material is 3 to 5 feet. Material passing No. 200 sieve is 10 to 20 percent.

Poor. Soil has one or more of the following features: Texture is sandy loam. Depth of overburden is 40 to 60 inches. Thickness of material is 1 to 3 feet. Material passing No. 200 sieve is 20 to 50 percent.

Unsuitable. Soil has one or more of the following features: Texture is loam, silt loam, clay loam, or clay. Depth of overburden is more than 60 inches. Thickness of material is less than 1 foot. Material passing No. 200 sieve is more than 50 percent.

Gravel.--Soil is rated as a source of construction material for use in concrete aggregate. The groupings are generalized and are not intended to eliminate the need for onsite sampling and testing of material for specific engineering work and uses. Gradation and quality of the material, accessibility of the source, and depth to the water table are not considered.

The suitability ratings shown in table 4 are defined as follows.

Good. Soil has all of the following features: Soil is more than 75 percent gravel. Depth of overburden is less than 20 inches. Thickness of material is more than 5 feet.

Fair. Soil has one or more of the following features: Soil is 50 to 75 percent gravel. Depth

of overburden is 20 to 40 inches. Thickness of material is 3 to 5 feet.

Poor. Soil has one or more of the following features: Soil is 25 to 50 percent gravel. Depth of overburden is 40 to 60 inches. Thickness of material is 1 to 3 feet.

Unsuitable. Soil has one or more of the following features: Soil is less than 25 percent gravel. Depth of overburden is more than 60 inches. Thickness of material is less than 1 foot.

Road fill.--Soil is rated according to its performance if excavated and used as fill for road subgrade. The interpretations shown in table 4 should be supplemented by onsite investigation of any proposed construction area. Accessibility of source material is not considered.

The suitability ratings shown in table 4 apply to a mixture of all layers in the profile. They are defined as follows.

Good. Soil has all of the following features: Textural classification of gravel, silty gravel, clayey gravel, sand, loamy sand, sandy loam, sandy clay loam, or sandy clay in the AASHO classifications of A-1, A-2, or A-3.

Fair. Soil has one or more of the following features: Textural classification of silt, silt loam, sandy loam, loam, silty clay loam, clay loam, or sandy clay loam in the AASHO classifications of A-4, A-5, or A-6.

Poor. Soil has one or more of the following features: Textural classification of silty clay, clay, sandy clay, organic silt, or organic clay in the AASHO classifications of A-6 or A-7.

Road location.--The suitability of a soil for road location is influenced by features of the undisturbed soil that affect construction and maintenance. Among the features considered are soil depth, permeability, slope, shrink-swell potential, plasticity, rockiness, and high water table.

Extreme caution is urged in planning cuts to a depth of more than 5 feet in upland soils. Below this depth, geological strata tend to vary. Generally, onsite investigation is needed.

Water-retention structures.--The suitability of undisturbed soil for use in construction of irrigation reservoirs, fish ponds, stockwater ponds, recreation lakes, sewage lagoons, and other water-retention structures depends on its suitability as a floor for impoundment areas and as a source of embankment material. The soil features considered are those that relate to minimum seepage of both the impoundment area and the embankment, and to the stability and safety of the embankment.

Among the soil properties or qualities considered in selecting material to be used as a floor for impoundment areas are the texture, the percentage of coarse fragments, the permeability of the most restrictive layer in the profile, the slope, the depth to hard rock, and the percentage of organic matter.

For embankments, the most important considerations are the availability of adequate soil material suitable for the structure and capable of holding water. The material must allow only a minimum of seepage. Soil texture, strength, stability, compressibility, and susceptibility to piping and cracking are considered. Thorough investigation of the site is needed.

Irrigation.--The distribution of irrigation water and the depth to which water penetrates into the soil depend on the intake rate, the available water holding capacity, the depth to restricting layers, the slope, and permeability.

Intake rate is the rate at which water enters the soil. When water is first applied, the rate of entry at the soil surface is rapid. As more water is applied, the rate gradually decreases. Eventually the rate becomes nearly constant. This nearly constant rate is the basic intake rate. Intake rate varies with the kind of soil, the type of management, the method of application, and the slope. Very rapid indicates an intake rate per hour of 3 inches or more; rapid, 1 inch to 3 inches; moderate, 0.3 to 1 inch; and slow, less than 0.3 inch.

Available water holding capacity is the capacity of a soil to hold water in a form available to plants. It is the difference between the amount of water held at the permanent wilting point of a plant and the amount held at field capacity. The capacity of sandy soils is generally low, and that of clayey soils is high. The available water holding capacity is measured to a depth of 5 feet, to bedrock, or to a hardpan. A rating of high indicates more than 7.5 inches; moderate, 3.75 to 7.5 inches; and low, less than 3.75 inches.

Soils must be deep enough to store satisfactory amounts of irrigation water at each irrigation. Shallow soils require frequent irrigations. Excessive deep percolation losses generally occur if soils are shallow over coarse-textured, highly permeable material, such as sand and gravel. Shallow indicates a depth of 20 inches or less; moderately deep, 30 to 40 inches; deep, 40 to 60 inches; and very deep, 60 inches or more.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, horticultural crops, or other crops requiring special management.

The map "Suitability for Farming" shows how a

sheet of the detailed soil map can be colored to show the suitability or limitations of the soils for crops in any given locality. The map "Soil Erosion Hazard" shows how a sheet can be colored to show differences in erosion hazard. The terms "High" and "Very high" on the legend of this map are equivalent to the terms "Severe" and "Very severe" in the text of this survey.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, all kinds of soils are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat. There are no class V soils in the Ventura Area.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife habitat, or water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by w, s, and c, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-3 or IIIe-5. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Capability units in California are identified by numbers that indicate the chief limitation of the soils in the capability class and subclass. For this reason, some of the units in any given subclass are not numbered consecutively; the numbers are a key to some of the limitations. Capability unit I-1 is an exception; the unit number "1" indicates nearly level soil or an erosion hazard of none to no more than slight. The numbers used to designate units are--

0 Coarse sandy or very gravelly substratum.
1 Potential or actual erosion hazard.
2 Poor drainage or overflow hazard.
3 Slow or very slow permeability in subsoil or substratum.
4 Coarse or gravelly texture.
5 Fine or very fine texture.
6 Excess salts or alkali.
7 Stones, cobblestones, or rock outcrop.
8 Shallowness over hardpan or hard, unweathered bedrock.
9 Low inherent fertility, which is associated with strong acidity, low calcium-magnesium ratio, or excess calcium, boron, or molybdenum.

The acreage by capability units and classes in the Ventura Area in 1969 was as follows:

Class I:

	Acres
Unit I-1--------	24,307
Subtotal	24,307

Class II:

	Acres
Unit IIe-1	51,490
Unit IIe-3	3,996
Unit IIe-5	5,743
Unit IIw-2	44,216
Unit IIw-5	1,367
Unit IIs-1	246
Unit IIs-4	13,458
Unit IIs-5	3,325
Subtotal	123,841

Class III:

Unit IIIe-1	10,052
Unit IIIe-3	7,931
Unit IIIe-5	2,057
Unit IIIs-0	2,026
Unit IIIs-4	8,812
Subtotal	30,878

Class IV:

Unit IVe-1	21,847
Unit IVe-3	12,224
Unit IVe-5	3,232
Unit IVe-7	2,984
Unit IVw-4	8,814
Unit IVs-7	4,875
Subtotal	53,976

Class VI:

Unit VIe-1	66,319
Unit VIe-3	2,416
Unit VIe-5	1,870
Unit VIe-7	1,010
Unit VIs-1	3,285
Unit VIs-7	1,177
Subtotal	76,077

Class VII:

Unit VIIe-1	101,358
Unit VIIe-3	7,929
Unit VIIe-8	24,501
Unit VIIs-4	6,709
Unit VIIs-8	27,865
Subtotal	168,362

Class VIII:

Unit VIIIe-1	28,220
Unit VIIIw-4	10,393
Unit VIIIw-6	1,790
Unit VIIIs-1	29,060
Subtotal	69,463
Water	1,970
Total	548,874

Management by Capability Units

Utilization of crop residue, minimum tillage, cover crops, and fertilization are common management practices in the Ventura Area.

Disking or plowing under the tree prunings, tomato and bean vines, sugar beet tops, and other crop residue provides organic matter and reduces soil loss from erosion. The addition of organic matter to the soil increases fertility, aeration, and moisture penetration, and maintains or improves soil structure.

Minimum tillage helps in maintaining soil structure and reducing compaction, thus influencing air and water movement through the soil. Chemical weed control reduces the amount of tillage needed. Proper timing of tillage operations is important. All tilling should be done when moisture conditions are such that compaction can be kept to a minimum. Well-designed access roads that minimize travel over the soil help in reducing compaction.

Cover crops are effective in protecting and improving cropland and orchards during the winter. Trieste mustard, peas, barley, and volunteer forbs and grasses provide protection against water and wind erosion and improve water intake, thus reducing runoff. Cover crops utilized as green manure also add organic matter to the soil.

Fertilization is generally needed to maintain or increase soil productivity. The kinds and amounts of fertilizer vary according to the crop. Nearly all crops except forage legumes respond to nitrogen. Legumes, truck crops, and field crops respond to phosphorus. Some crops are deficient in zinc and other micro elements. Citrus crops and avocados on the Balcom, Castaic, Garretson calcareous variant, Metz, Mocho, Nacimiento, Pico, and other highly calcareous soils are subject to chlorosis.

It is assumed that irrigation water is available, or can be made available, for all arable soils in the Area.

In the following pages the capability units in the Ventura Area are described, and suggestions for the use and management of the soils are given. The names of the soil series represented are mentioned

in the description of each unit, but this does not mean that all the soils of a given series are in the unit. The capability unit designations for each soil in the Area can be found in the "Guide to Mapping Units."

Capability Unit I-1

This unit consists of very deep, well-drained loams, clay loams, and silty clay loams of the Garretson, Mocho, Salinas, Sorrento, and Vina series. These soils are uniform in texture throughout the profile. They formed on plains and alluvial fans, in alluvium derived from sedimentary and basic igneous rocks. They have slopes of 0 to 2 percent. Annual rainfall ranges from 14 to 20 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 280 to 350 days. Permeability is moderate to moderately slow. Runoff is very slow to slow, and there is no erosion hazard. Roots can penetrate to a depth of 60 inches. The available water holding capacity to this depth is 8 to 12 inches. Inherent fertility is medium to high.

The soils in this unit are used for vegetables, field crops, citrus crops, walnuts, and avocados. They are well suited to all crops suited to the climate.

These soils have no specific limitations. They respond to management practices, such as utilization of crop residue and cover crops, minimum tillage, and fertilization. Furrows and sprinklers are used for irrigating. Tillage pans that develop because of excessive trampling and tillage when the soils are moist can be broken easily by chiseling and subsoiling. Leveling and shaping do not expose subsoil material that cannot readily be made productive. Some areas are flooded very infrequently. Flooding does not affect or limit the selection of crops. Leaving crop residue and stubble as protection against erosion is important if field crops are grown.

Capability Unit IIe-1

This unit consists of very deep, well-drained sandy loams, loams, silt loams, clay loams, and silty clay loams of the Anacapa, Garretson, Garretson calcareous variant, Mocho, Pico, Salinas, Sorrento, Sorrento heavy variant, Vina, and Zamora series. These soils formed on alluvial fans and plains, in alluvium derived from sedimentary and basic igneous rocks. They have slopes of 2 to 9 percent. One of each of the Anacapa, Mocho, and Vina soils is 15 to 25 percent gravel 2 to 10 millimeters in size. Annual rainfall ranges from 14 to 24 inches; the average annual air temperature is between 60° and 62° F., and the frost-free season is about 250 to 350 days. Permeability is slow to moderately rapid. Runoff is slow to medium, and the erosion hazard slight to moderate. The available water holding capacity is 5 to 12 inches in the 60 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are well suited to all crops suited to the climate. They are used for vegetables, field crops, citrus crops, avocados, and walnuts, and for range.

The major limitations are the slope and the erosion hazard. The hazard of erosion can be lessened by planting across the slope and by maintaining cover crops on embankments. Provision for handling runoff is needed if the slope is more than 2 percent. Utilization of crop residue, minimum tillage, and fertilization are suggested management practices. Furrows and sprinklers are used for irrigating. The Anacapa and Pico soils need more frequent irrigations and shorter furrows than the other soils in this unit. Leveling and shaping do not expose subsoil material that cannot readily be made productive. Leaving crop residue and stubble as protection against erosion is important if field crops are grown.

Capability Unit IIe-3

This unit consists of very deep, well-drained soils of the Azule and Rincon series. These soils have a surface layer of loam to silty clay loam and a subsoil of sandy clay loam to sandy clay. They formed on old terraces and alluvial fans, in alluvium derived from sedimentary rock. They have slopes of 0 to 9 percent. Annual rainfall ranges from 14 to 20 inches; the average annual air temperature is 60° F.; and the frost-free season is about 250 to 330 days. Permeability is slow. Runoff is slow to medium, and the erosion hazard is slight to moderate. The fine texture of the subsoil does not restrict root development; roots penetrate to a depth of 60 inches. The available water holding capacity to this depth is 8.5 to 10.5 inches. Inherent fertility is medium to high.

The soils in this unit are used for citrus crops and field crops and for range. They are not well suited to avocados.

The major limitations are the fine texture and slow permeability of the subsoil, the slope, and the erosion hazard. Irrigation water must be applied slowly because of slow intake and slow permeability. Both furrows and sprinklers are used for irrigating; sprinklers are better suited if the slope is more than 5 percent. Provision for handling runoff is needed in all cultivated areas where the slope is more than 2 percent. Ripping when the soils are fairly dry improves the permeability of the subsoil and reduces runoff. Minimum tillage and utilization of crop residue are suggested management practices. In land smoothing, care must be taken to avoid deep cuts that expose the fine-textured subsoil. The hazard of erosion can be lessened by planting across the slope and by maintaining cover crops on embankments. Leaving crop residue and stubble as protection against erosion is important if field

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crops are grown. The response to seeding and fertilization of range is favorable.

Capability Unit IIe-5

The one soil in this unit, Cropley clay, 2 to 9 percent slopes, is very deep and well drained. It has a substratum of sandy clay loam, silt loam, silty clay loam, or clay. This soil formed on alluvial fans and plains, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 16 inches; the average annual air temperature is 61° F.; and the frost-free season is about 280 to 330 days. Permeability is slow. Runoff is slow to medium, and the erosion hazard slight to moderate. The available water holding capacity is 8 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for vegetables, citrus crops, and field crops.

The major limitations are the slope and the fine texture. Tilling must be done when soil moisture conditions are optimum; the soils become very hard when dry and very sticky when wet. Minimum tillage, planting across the slope, and utilizing crop residue are suggested management practices. The proper application of irrigation water is important. Irrigation water should be applied slowly. Furrow runs across the slope and sprinklers are used. Moderate cuts made in shaping do not expose unfavorable subsoil material, but deep cuts are likely to expose material that contains considerable lime and is less responsive to management. Ripping increases moisture intake and reduces runoff. Leaving crop residue and stubble as protection against erosion is important if field crops are grown.

Capability Unit IIw-2

This unit consists of very deep, poorly drained loamy sands, sandy loams, loams, and silty clay loams of the Camarillo, Hueneme, and Pacheco series. These soils have a substratum of loamy sand, sandy loam, loam, fine sandy clay loam, or silty clay loam. Typically, they are highly stratified below a depth of 40 inches with thin layers that range from sand to light clay in texture. These soils formed on alluvial fans and plains, in stratified alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 2 percent. Annual rainfall ranges from 14 to 16 inches; the average annual air temperature is 59° or 60° F.; and the frost-free season is 300 to 350 days. Permeability is moderately rapid to moderately slow. Runoff is very slow to ponded, and there is no erosion hazard. The available water holding capacity is 5 to 11 inches in the 60 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are used for vegetables, strawberries, and lemons, and for field crops.

The major limitation is wetness. Unless artificially drained, these soils have a seasonal high water table within a depth of 2 to 3 feet and are limited to shallow-rooted crops. Open ditches, tile drains, and mole drains are commonly used for lowering the water table. Both furrows and sprinklers are used for irrigating. Careful management is essential to avoid raising the water table. The finer textured Pacheco soils require slower applications of irrigation water than do the coarser textured soils. All of the soils in this unit are subject to infrequent flooding. Runoff from higher areas should be diverted into suitable outlets to prevent overflow. Minimum tillage and utilization of crop residue decrease the hazard of compaction. Leaving crop residue and stubble as protection against erosion is important if field crops are grown.

Capability Unit IIw-5

The one soil in this unit, Cropley clay, calcareous variant, is very deep and somewhat poorly drained. Its substratum is heavy clay loam. In places the substratum is stratified. This soil formed on alluvial plains, in alluvium derived from sedimentary rocks. It has slopes of 0 to 2 percent. Annual rainfall ranges from 14 to 16 inches; the average annual air temperature is 61° F.; and the frost-free season is 300 to 330 days. Permeability is slow. Runoff is very slow, and there is no erosion hazard. The available water holding capacity is 8 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used primarily for vegetables and lemons and for field crops.

The major limitations are the fine texture, the somewhat poor drainage, and the hazard of overflow. Unless artificially drained, this soil has a seasonal high water table within a depth of 3 to 5 feet. In undrained areas it is limited to shallow-rooted crops. Open ditches and tile drains are commonly used for lowering the water table. Irrigation water should be applied slowly because of slow intake. Careful management is essential to avoid raising the water table. Both sprinklers and furrows are well suited. These soils are subject to infrequent flooding. Runoff from higher areas should be diverted into suitable outlets to prevent overflow. Tilling must be done when moisture conditions are optimum; the soil becomes very hard when dry and very sticky when wet. Ripping increases moisture intake and reduces runoff. Erosion control is not usually needed. Leaving crop residue and stubble on the surface as protection against erosion is important if field crops are grown.

Capability Unit IIs-1

The one soil in this unit, Ojai very fine sandy loam, 0 to 2 percent slopes, is very deep and well drained. It has a subsoil of fine sandy clay loam and a substratum of very cobbly and gravelly light clay. This soil formed on old dissected terraces, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 21 inches; the average

annual air temperature is 61° F.; and the frost-free season is about 248 to 300 days. Permeability is moderately slow. Runoff is slow, and the erosion hazard slight. The available water holding capacity is 5.5 to 7.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for citrus crops, avocados, dryland grain, and field crops, and for range.

The major limitations are the low water-holding capacity and the moderately fine textured subsoil. In leveling and shaping, care must be taken to avoid deep cuts that expose the substratum. The proper application of irrigation water is important. Furrows and sprinklers are well suited. Longer sets and slower application should be maintained if sprinklers are used. Minimum tillage and utilization of crop residue help in reducing the hazard of compaction. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. The response to seeding and fertilization of range is favorable. In places brush control is needed.

Capability Unit IIs-4

This unit consists of very deep, well-drained and excessively drained soils of the Anacapa, Metz, and Pico series. The surface layer of these soils ranges from loamy sand and loamy fine sand to sandy loam, and the substratum from sand to sandy loam or loam. In places the substratum is highly stratified. These soils formed on alluvial fans and plains, in alluvium derived from sedimentary rocks. They have slopes of 0 to 9 percent. Annual rainfall ranges from 14 to 18 inches; the average annual air temperature is 60° F.; and the frost-free season is about 300 to 350 days. Permeability is moderately rapid to rapid. Runoff is very slow to slow, and the erosion hazard none to slight. The available water holding capacity is 5 to 7.5 inches in the 60 inches of effective rooting depth. Inherent fertility is low to medium.

These soils are used for vegetables, strawberries, citrus crops, avocados, walnuts, and field crops, and for range.

The major limitation is the low water-holding capacity. If the slope is more than 2 percent, erosion is a hazard. The proper application of irrigation water is particularly important. Frequent light applications are essential. Furrows can be used on slopes of more than 2 percent if they are across the slope or on the contour; runs need to be shorter than those on finer textured soils. Sprinklers are well suited if the slope is more than 5 percent. The hazard of erosion can be lessened by planting across the slope and by maintaining cover crops on embankments. Provision for handling runoff is needed if the slope is more than 2 percent. Leveling and shaping do not expose unfavorable substratum material. Because of the low fertility of the sandy Metz soils, skillful irrigation management and utilization of crop residue and green-manure crops are needed.

Capability Unit IIs-5

The one soil in this unit, Cropley clay, 0 to 2 percent slopes, is very deep and well drained. It has a substratum of stratified silt loam and silty clay loam. This soil formed on alluvial fans and plains, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 16 inches; the average annual air temperature is 61° F.; and the frost-free season is about 300 to 330 days. Permeability is slow. Runoff is slow, and there is no erosion hazard. The available water holding capacity is 8 to 10 inches in the 60 inches of effective rooting depth. Inherent fertility is high.

This soil is used for vegetables, citrus crops, and field crops.

The major limitation is the fine texture. Tilling must be done when moisture conditions are optimum; the soils become very hard when dry and very sticky when wet. The proper application of irrigation water is important. Irrigation water should be applied slowly because of slow intake. Both sprinklers and furrows are well suited. Ripping increases moisture intake and reduces runoff. Erosion control is not usually needed.

Capability Unit IIIe-1

This unit consists of moderately deep to very deep, well-drained very fine sandy loams, loams, clay loams, and silty clay loams of the Castaic, Balcom, Linne, Los Osos, Nacimiento, Ojai, San Benito, Sorrento heavy variant, and Zamora series. These soils have a substratum of sandy loam, clay loam, silty clay loam, or clay. Ojai, Sorrento, and Zamora soils formed on alluvial fans, benches, and terraces, in alluvium derived predominantly from sedimentary rocks. They have slopes of 2 to 15 percent. Castaic, Balcom, Linne, Los Osos, Nacimiento, and San Benito soils formed on upland areas, in soft sediments weathered from shale and fine-grained sandstone. They have slopes of 9 to 15 percent. Annual rainfall ranges from 14 to 21 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 330 days. Permeability is slow to moderate. Runoff is slow to medium, and the erosion hazard slight to moderate. The available water holding capacity is 3.5 to 11.5 inches in the 22 to 60 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are used for field crops, citrus crops, and avocados, for range, and for watershed.

The major limitations are the slope and the erosion hazard. The hazard of erosion can be lessened by farming on the contour or on terraces and by maintaining cover crops on embankments and idle fields during the winter. Diversion terraces help in controlling runoff and reducing the hazard of erosion. Careful management of irrigation water is important. Sprinklers are well suited. Furrows can be used on terraces, and if they are on the contour,

on slopes of as much as 5 percent. Water should be applied slowly to the Los Osos, Ojai, and Zamora soils. Subsoiling on the contour when the soils are fairly dry increases intake and reduces runoff. Minimum tillage and utilization of crop residue are suggested management practices. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. The response to seeding and fertilization of range is favorable. In places brush control is needed. Watersheds should be protected from fire.

Capability Unit IIIe-3

This unit consists of sandy loams, very fine sandy loams, loams, and silty clay loams of the Azule, Kimball, Rincon, and Huerhuero series. The Huerhuero soil is shallow to moderately deep and moderately well drained. The rest are very deep and well drained. All have a subsoil of sandy clay loam, sandy clay, or clay. The Huerhuero soil has an abrupt boundary between the surface layer and the subsoil. One of the Azule soils is 20 to 35 percent gravel 2 to 10 millimeters in size. All of the soils in this unit formed on alluvial fans, old terraces, and benches, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Annual rainfall ranges from 14 to 21 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 330 days. Permeability is slow to very slow. Runoff is slow to medium, and the erosion hazard slight to moderate. The available water holding capacity for the Huerhuero soil is 2.5 to 5 inches in the 18 to 30 inches of effective rooting depth. For the rest of the soils, it is 5.5 to 10.5 inches in 60 inches of effective rooting depth. Inherent fertility is medium to high for all.

The soils in this unit are used for field crops and citrus crops, for range, and for watershed.

The major limitations are the fine-textured subsoil, the slope, and the erosion hazard. An additional limitation for the Huerhuero soil is the limited root zone. Skillful irrigation management is essential. Irrigation water must be applied slowly because of slow intake. Furrows can be used if they are on the contour. Sprinklers are better suited if the slope is more than 5 percent. Provision for handling runoff is needed in areas where the slope is more than 2 percent. Ripping when the soil is relatively dry improves permeability and reduces runoff. In smoothing, care must be taken to avoid deep cuts that expose the subsoil. The hazard of erosion can be lessened by planting on the contour and by maintaining cover crops on embankments and idle fields during the winter. Diversion terraces help in controlling runoff and reducing erosion. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. The response to seeding and fertilization of range is favorable. Watersheds should be protected from fire.

Capability Unit IIIe-5

This unit consists of moderately deep to deep, well-drained clays of the Cibo and Diablo series. These soils have a substratum of clay and clay loam. They formed on uplands and have slopes of 5 to 15 percent. The Cibo soil overlies basic igneous rocks, and the Diablo soil soft, fractured shale. Annual rainfall ranges from 14 to 22 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 330 days. Permeability is slow. Runoff is slow to medium, and the erosion hazard slight to moderate. The available water holding capacity is 5 to 9 inches in the 34 to 54 inches of effective rooting depth. Inherent fertility is high.

These soils are used for field crops, for range, and for watershed. Some areas are used for lemons.

The major limitations are the slope and the fine texture. Tilling must be done when soil moisture conditions are optimum; the soils become very hard when dry and very sticky when wet. The proper application of irrigation water is important. Water must be applied slowly because of slow intake. Sprinklers are well suited. Furrows can be used on terraces. Diversion terraces for handling runoff and permanent vegetation help in controlling erosion. Ripping increases moisture intake and reduces runoff. Care must be taken to avoid deep cuts that expose the hard basic rock under Cibo soils or the strongly calcareous shale under Diablo soils. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. These soils produce large amounts of forage. The response to seeding of range is favorable. Livestock should be kept off the range when the soils are wet. Brush control is needed in some areas. Watersheds should be protected from fire.

Capability Unit IIIs-0

The one soil in this unit, Pico loam, sandy substratum, 0 to 2 percent slopes, is moderately deep and somewhat excessively drained. It has a substratum of gravelly and stony coarse sand. This soil formed on alluvial fans and plains, in alluvium derived predominantly from sedimentary rocks. Annual rainfall ranges from 14 to 18 inches; the average annual air temperature is 62° F.; and the frost-free season is 300 to 350 days. Permeability is rapid. Runoff is very slow, and there is no erosion hazard. The available water holding capacity is about 3.5 to 5.5 inches in the 24 to 36 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for vegetables, field crops, and citrus crops, and for range.

The major limitation is the coarse-textured material at a depth of 2 to 3 feet, which restricts the root zone and the amount of water available. Furrows and sprinklers are used for irrigating. Careful management is important. Wasting water through deep percolation should be avoided. In smoothing,

care must be taken to avoid deep cuts that expose the substratum. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. The response to seeding and fertilization of range is favorable.

Capability Unit IIIs-4

This unit consists of very deep, excessively drained and somewhat excessively drained loamy sands and loamy coarse sands of the Corralitos and Metz series. These soils have a substratum of loamy coarse sand or gravelly coarse sand. They formed on plains and alluvial fans, in alluvium derived predominantly from sedimentary rocks. They have slopes of 0 to 9 percent. Annual rainfall ranges from 14 to 18 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 280 to 340 days. Permeability is rapid to very rapid. Runoff is slow to very slow, and the erosion hazard none to slight. Roots penetrate to a depth of 60 inches. The available water holding capacity to this depth is 3.7 to 5 inches. Inherent fertility is low.

The soils in this unit are used for vegetables, field crops, strawberries, citrus crops, avocados, and walnuts.

The major limitations are the coarse texture, the low water-holding capacity, the slope, and the erosion hazard. The proper application of irrigation water is particularly important. Intake is rapid, and storage capacity is low. Frequent, light applications of irrigation water are needed. Sprinklers are well suited. Furrows can be used on slopes of less than 2 percent, and if furrows are on the contour, on slopes of as much as 5 percent. All furrows are on the contour on slopes of as much as 5 percent. All furrows must be short. There is poor lateral distribution of water between furrows. The hazard of erosion can be lessened by farming on the contour and by maintaining a cover crop on embankments and idle fields during the winter. Leveling and grading cause little damage. Utilizing crop residue, turning under green-manure crops, and adding other organic matter are desirable management practices. Leaving crop residue and stubble on the surface as protection against erosion is important if field crops are grown.

Capability Unit IVe-1

This unit consists of shallow to very deep, well-drained very fine sandy loams, loams, clay loams, shaly silty clay loams, and silty clay loams of the Balcom, Castaic, Gazos, Gilroy, Linne, Los Osos, Nacimiento, Ojai, San Benito, Santa Lucia, and Sespe series. These soils have a substratum of shaly loam, clay loam, shaly silty clay loam, sandy clay, or clay. All except the Ojai soil formed on uplands, in softly consolidated sediments weathered from shale, sandstone, and basic igneous rocks. The Ojai soil formed on old dissected terraces, in alluvium derived from sedimentary rocks. Slopes range from 9 to 30 percent. Annual rainfall ranges from 14 to 25 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 300 days. Permeability is slow to moderate. Runoff is medium to rapid, and the erosion hazard moderate to severe. The available water holding capacity is 3.5 to 10.5 inches in the 20 to 60 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are used for field crops, citrus crops (see pl. II), and avocados, and for range.

The major limitations are the slope and the erosion hazard. If the slope gradient is more than 15 percent, tree crops should be planted on bench terraces. Planting on the contour or on widely spaced terraces is common on the more gentle slopes. Permanent vegetation between tree rows and on terrace embankments is essential for erosion control. Diversion terraces for intercepting and controlling runoff and thus reducing the hazard of erosion are required on contoured soils. The depth to hard rock underlying the Gazos, Gilroy, and Santa Lucia soils, and the fine-textured subsoil and hard rock of the Los Osos and Sespe soils are factors to be considered if terraces are constructed. Deep cuts should be avoided in the Ojai soils to keep from exposing the unfavorable subsoil. Sprinkler irrigation is well suited to all the soils; furrows can be used on terraces. Irrigation water must be applied slowly, because of the moderately fine texture of all of these soils and the finer textured subsoil of the Los Osos, Ojai, and Sespe soils. Returning crop residue to the soil reduces the risk of compaction and the hazard of erosion. The response to seeding and fertilization of range is favorable. Brush control is needed in some areas. Watersheds should be protected from fire.

Capability Unit IVe-3

This unit consists of shallow to very deep, moderately well drained to well drained coarse sandy loams, sandy loams, very fine sandy loams, loams, and silty clay loams of the Azule, Chesterton, Huerhuero, Kimball, Malibu, and Rincon series. These soils have a subsoil of clay loam, sandy clay loam, sandy clay, or clay. Typically, the boundary between the surface layer and subsoil is abrupt. The fine-textured subsoil does not favor extensive root development. The Chesterton soil has a hardpan below the subsoil. All of these soils except the Malibu soil formed on old terraces, benches, and alluvial fans, in alluvium derived predominantly from sedimentary rocks. The Malibu soil formed on uplands, in material weathered from sandstone. Slopes range from 5 to 30 percent. Annual rainfall ranges from 14 to 21 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 330 days. Permeability is very slow to slow. Runoff is slow to

rapid, and the erosion hazard slight to severe. The available water holding capacity is 2 to 10.5 inches in the 12 to 60 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are used for citrus crops and field crops, for range, and for watershed.

The major limitations are the fine-textured subsoil, the slope, and the erosion hazard. The Chesterton, Huerhuero, and Malibu soils have a limited root zone because of the claypan or hardpan. They require skillful management if used for citrus crops. Irrigation water must be applied slowly because of slow intake and slow or very slow permeability. Sprinklers are well suited. Contour furrows can be used on the more gentle slopes and on terraces. Diversion terraces for intercepting and controlling runoff so as to reduce the hazard of erosion are needed on the steeper slopes. The depth to the fine-textured subsoil and, particularly, the depth to the hardpan in the Chesterton soil are important factors to be considered if terraces are constructed. Permanent vegetation on terrace embankments is essential for erosion control. Returning crop residue to the soil reduces the risk of compaction and the hazard of erosion. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. The response to seeding and fertilization of range is favorable. Brush control is needed in some areas. Watersheds should be protected from fire.

Capability Unit IVe-5

This unit consists of moderately deep to deep, well-drained clays of the Cibo and Diablo series. These soils have a substratum of clay loam or clay. They formed in upland areas and have slopes of 15 to 30 percent. The Cibo soil formed in material weathered from basic igneous rocks, and the Diablo soil in material weathered from soft, fractured shale. Annual rainfall ranges from 14 to 24 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 330 days. Permeability is slow. Runoff is medium to rapid, and the erosion hazard moderate to severe. The available water holding capacity is 4 to 8.5 inches in the 24 to 50 inches of effective rooting depth. Inherent fertility is high.

These soils are used for range, for watershed, for dryland grain, and for lemons.

The major limitations are the slope and the fine texture. Tilling must be done when soil moisture conditions are optimum; the soils become very hard when dry and very sticky when wet. Deep cuts should be avoided in the Cibo soil to keep from exposing the underlying hard rock. Leaving crop residue and stubble as protection against erosion is important if field crops are grown. These soils produce large amounts of forage. The response to seeding of range is favorable. Livestock should be kept off the range when the soils are wet. Brush control is needed in some areas. Irrigation water must be applied slowly because of slow intake. Sprinklers are well suited. Furrows can be used on terraces. Watersheds should be protected from fire.

Capability Unit IVe-7

The one soil in this unit, Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded, is very deep and well drained. It has a substratum of stony and cobbly fine sandy clay loam. This soil formed on old dissected terraces, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 21 inches; the average annual temperature is 61° F.; and the frost-free season is about 250 to 300 days. Permeability is moderately slow. Runoff is slow to medium, and the erosion hazard slight to moderate. The available water holding capacity is 5 to 6.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for citrus crops and avocados and for range.

The major limitations are the stoniness, the slope, and the erosion hazard. Leveling or shaping is limited by stoniness. Removal of stones is generally needed before a crop is planted. The control of weeds by means of herbicides is the general practice. Sprinkler irrigation is well suited to this soil. Frequent light applications are needed because of low water-holding capacity. Keeping permanent vegetation on slopes and returning crop residue help in controlling erosion. Range seeding, fertilization, and brush control are suggested practices.

Capability Unit IVw-4

This unit consists of Sandy alluvial land and Fill land. Sandy alluvial land is sandy, gravelly, and cobbly. It is flooded infrequently, immediately after a storm. Fill land consists of mechanically mixed or artificially filled areas of a soil material that varies in depth and texture and is poorly drained. Annual rainfall ranges from 14 to 20 inches; the average annual air temperature is between 59° and 62° F.; and the frost-free season is about 250 to 350 days. Permeability, runoff, and available water holding capacity, the depth of the root zone, inherent fertility, and the erosion hazard all vary.

If flooding is controlled, these land types can be used for range and for citrus crops.

The major limitations are the coarse texture, the low water-holding capacity, the flood hazard, and the drainage. The varying nature and thickness of fill material make it difficult to predict management needs for Fill land. Onsite investigation should be made in any area proposed for a specific use. In general, unfavorable conditions resulting from a high water table can be overcome by installing open ditches and tile drains. The likelihood of salinity problems should be considered when selecting vegetative plantings. Dikes, diversions, or

other means of protection from flooding are needed if Sandy alluvial land is used for citrus crops. Sprinkler irrigation is well suited to both land types. Frequent, light applications are needed. Utilizing crop residue and turning under green-manure crops are especially helpful in improving fertility. Both land types support limited amounts of forage. The response to fertilization is good.

Capability Unit IVs-7

The one soil in this unit, Cortina stony sandy loam, 2 to 9 percent slopes, is very deep and somewhat excessively drained. It has a substratum of stony and cobbly sand. This soil formed on alluvial fans and valley floors, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 18 inches; the average annual air temperature is 62° F.; and the frost-free season is about 250 to 300 days. Permeability is rapid. Runoff is slow, and the erosion hazard slight. The available water holding capacity is 2 to 3.5 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used for citrus crops and avocados and for range.

The major limitations are the stoniness, the low water-holding capacity, the slope, and the erosion hazard. Leveling or shaping is limited by excessive stoniness. Removal of stones is generally needed before a crop is planted. The control of weeds by means of herbicides is the general practice. Sprinklers are used for irrigating. Frequent, light applications are needed because of low water-holding capacity. Keeping permanent vegetation on slopes and returning crop residue help in controlling erosion. Range seeding, fertilization, and brush control are suggested practices.

Capability Unit VIe-1

This unit consists of shallow to very deep, well-drained sandy loams, loams, clay loams, shaly silty clay loams, and silty clay loams of the Balcom, Castaic, Gazos, Linne, Los Osos, Nacimiento, San Benito, Santa Lucia, Saugus, Sespe, and Soper series. These soils are underlain by sandy loam, loam, clay loam, shaly silty clay loam, silty clay loam, sandy clay, gravelly sandy clay, or clay. They formed on uplands in softly consolidated sediments weathered from shale or sandstone. Slopes range from 5 to 50 percent. Annual rainfall ranges from 14 to 24 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 300 days. Permeability is slow to moderate. Runoff is medium to rapid, and the erosion hazard moderate to severe. Roots penetrate to a depth of 20 to 60 inches. The available water holding capacity to this depth is 2.5 to 10.5 inches. Inherent fertility is medium to high.

The soils of this unit are used mainly for range and for watershed. Their major limitations are the slope and the erosion hazard. Avocados, citrus crops, and field crops are grown on the more gentle slopes of these soils.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, as a general rule, it has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Seeding with annual grasses and legumes is desirable if the plant cover has deteriorated. Annuals should not be grazed the first season until after the seed matures.

Fertilizer improves the forage. The response to fertilization is best if both nitrogen and phosphate are applied. In some places sulfur stimulates growth of legumes.

Brush control is beneficial in some areas; it increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Orchard plantings should be on the contour, across the slope, or on terraces. A system of waterways and protected outlets is needed to carry runoff from contoured or terraced fields. The depth to hard rock is an important factor if terraces are constructed on Gazos, Los Osos, Santa Lucia, and Sespe soils. Permanent vegetation is needed on terrace embankments for erosion control. Sprinkler irrigation is desirable, but correctly designed and carefully managed furrows on the contour or on terraces are satisfactory. Nontillage chemical weed control is advisable. All plant residue should be returned to the soil. Fertilizer is needed.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIe-3

This unit consists of very shallow to very deep, moderately well drained to well drained coarse sandy loams, sandy loams, loams, and silty clay loams of the Chesterton, Malibu, and Rincon series. These soils have a subsoil of sandy clay, sandy clay loam, or clay. The Chesterton and Malibu soils have an abrupt boundary between the surface layer and the subsoil. The Chesterton soil has a silica-cemented hardpan below the subsoil. The Chesterton and Rincon soils formed on old alluvial fans and terraces, in material weathered from sandstone and shale. They have slopes of 9 to 30 percent. For all soils in this unit, annual rainfall ranges from 14 to 20 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 270 to 330 days. Permeability is very slow to slow. Runoff is rapid, and the erosion hazard severe. The Chesterton and Malibu soils have 1 to 5 inches of water available in the 8 to 36 inches of effective rooting depth, and the Rincon soil has 8.5 to 10.5 inches in the 60 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are used primarily for range and for watershed. Small acreages are used for citrus crops and dryland grain. The major limitations are the slope, the erosion hazard, and the fine-textured subsoil.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Seeding with annual grasses and legumes is desirable if the plant cover has deteriorated. Annuals should not be grazed the first season until after the seed matures.

Fertilizer improves the forage. The response to fertilization is best if both nitrogen and phos phorus are applied. In some places sulfur stimulates growth of legumes.

Brush control is beneficial in some areas; it increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Skillful management is needed if citrus crops are grown. Citrus groves are planted on terraces and are irrigated by furrows or sprinklers. Diversion terraces are needed to intercept and control runoff and thus reduce the hazard of erosion. The depth to the fine-textured subsoil and, particularly, the depth to the hardpan in the Chesterton soil are important factors to be considered if terraces are constructed. Permanent vegetation is needed on terrace embankments for erosion control. Irrigation water should be applied slowly because of slow intake. Returning plant residue reduces the risk of compaction and the hazard of erosion.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIe-5

The one soil in this unit, Diablo clay, 30 to 50 percent slopes, is deep and well drained. It has a substratum of clay loam. This soil formed on uplands, in material weathered from shale. Annual rainfall ranges from 15 to 22 inches; the average annual air temperature is 60° F.; and the frost-free season is about 270 to 330 days. Permeability is slow. Runoff is rapid, and the erosion hazard severe. The available water holding capacity is 6 to 8.5 inches in the 40 to 50 inches of effective rooting depth. Inherent fertility is high.

This soil is used for range and for watershed. The major limitations are the slope and the fine texture.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil

is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Seeding with annual grasses and legumes is desirable if the plant cover has deteriorated. Annuals should not be grazed the first season until after the seed matures.

Fertilizer improves the forage. The response to fertilization is best if both nitrogen and phosphorus are applied. In some places sulfur stimulates growth of legumes.

Brush control is beneficial in some areas; it increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIe-7

The one soil in this unit, Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded, is very deep and well drained. It is 25 to 35 percent gravel, cobblestones, and stones. This soil is underlain by light to heavy stony fine sandy clay. It formed on old terraces, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 21 inches; the average annual air temperature is 61° F.; and the frost-free season is about 250 to 300 days. Permeability is moderately slow. Runoff is medium to rapid, and the erosion hazard moderate to severe. The available water holding capacity is 4 to 6 inches in the 60 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for citrus crops and for range. The major limitations are the stoniness, the low water-holding capacity, the fine-textured subsoil, numerous small gullies, and the slope.

Citrus groves should be planted on the contour or on terraces. The stones and the fine-textured subsoil are important factors to be considered if terraces are constructed. Sprinkler irrigation is desirable. Because of the stones, the low water-holding capacity, and the fine-textured subsoil, frequent and slow applications of irrigation water are needed. Nontillage chemical weed control is advisable. All plant residue should be returned to the soil. Permanent vegetation on terrace embankments is needed for erosion control. A system of waterways and protected outlets is needed to carry runoff from contoured or terraced fields.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

The response to seeding and fertilization of range is favorable. Seeding with annual grasses and legumes is desirable if the plant cover has deteriorated. Broadcasting is the best method of seeding. Annuals should not be grazed the first season until after the seed matures.

Fertilizer improves the forage. The response to fertilization is best if both nitrogen and phosphorus are applied. In some places sulfur stimulates growth of legumes.

Brush control is beneficial in some areas; it increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Protection against grazing animals and further erosion is important in all gullied areas. Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Capability Unit VIs-1

The one soil in this unit, Gilroy very rocky clay loam, 15 to 50 percent slopes, is moderately deep and well drained. It is 10 to 25 percent rock outcrops. This soil formed on uplands, in material weathered from basic igneous rocks. Annual rainfall ranges from 16 to 22 inches; the average annual air temperature is 61° F.; and the frost-free season is about 250 to 300 days. Permeability is moderately slow. Runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is about 2.5 to 4.5 inches in the 21 to 34 inches of effective rooting depth. Inherent fertility is medium.

This soil is used for range and for watershed. The major limitations are the rock outcrops, the slope, and the erosion hazard. This soil supports excellent range during periods of favorable rainfall.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control.

Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Seeding and fertilization of range are feasible. Brush control is beneficial in some areas; it increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIs-7

The one soil in this unit, Cortina very stony sandy loam, 9 to 15 percent slopes, is very deep and somewhat excessively drained. It is 50 to 75 percent stones and cobblestones and has a very stony, cobbly, sandy substratum. This soil formed on alluvial fans, in alluvium derived from sedimentary rocks. Annual rainfall ranges from 14 to 20 inches; the average annual air temperature is 62° F.; and the frost-free season is about 250 to 300 days. Permeability is rapid. Runoff is medium, and the erosion hazard moderate. The available water holding capacity is 1 inch to 2 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used for range, for watershed, and for citrus crops and avocados. The major limitations are the stoniness, the low water-holding capacity, the slope, and the erosion hazard.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Forage production is low, but seeding and fertilization of range are of questionable value. Brush control is beneficial in some areas; it increases the amount of forage and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Citrus and avocado plantings should be made on the contour. Some stone removal is necessary before the trees are planted. Sprinklers are used for irrigating. Frequent, light applications of irrigation water are needed. Nontillage chemical weed control is advisable. Permanent vegetation is needed on embankments for erosion control. All plant residue should be returned to the soil.

Capability Unit VIIe-1

This unit consists of Terrace escarpments and Landslides, shallow to very shallow shaly loams of the Calleguas series, and moderately deep to very deep, well-drained sandy loams, loams, clay loams, shaly silty clay loams, and silty clay loams of the Balcom, Castaic, Gazos, Nacimiento, San Andreas, San Benito, Santa Lucia, Saugus, Sespe, and Soper series. All but the Calleguas soils have a substratum of heavy sandy loam, very shaly loam, clay loam, shaly silty clay loam, silty clay loam, sandy clay, or gravelly sandy clay. They formed on uplands, in weakly consolidated sediments, shale, and sandstone. They have slopes of 30 to 75 percent. Annual rainfall ranges from 14 to 22 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 300 days. Permeability is slow to moderate. Runoff is rapid to very rapid, and the erosion hazard is severe to very severe. The available water holding capacity is 2.5 to 10.5 inches in the 20 to 60 inches of effective rooting depth. Inherent fertility is medium to high. Calleguas soils differ in having sandstone or shale at a depth of 4 to 20 inches, slopes of as little as 9 percent, medium to rapid runoff, a moderate to severe erosion hazard, 0.2 inch to 1.7 inches of water available to plants, and low inherent fertility.

All of these soils are used for range and water-

shed. The major limitations are the slope and the erosion hazard.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Forage production is low for San Andreas and Saugus soils but is excellent for the rest during periods of favorable rainfall. Seeding and fertilization of range are not practical.

Brush control is beneficial in some areas; it increases the amount of forage and makes handling of livestock easier. The undesirable plants can be controlled by chemical means, or, on selected sites, by controlled burning or mechanical means.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIIe-3

This unit consists of very shallow to moderately deep, moderately well drained to well drained very fine sandy loams and loams of the Huerhuero and Malibu series. These soils have a subsoil of sandy clay loam, sandy clay, or clay. The Huerhuero soil formed on alluvial fans and terraces, in alluvium derived from sedimentary rocks. It has slopes of 9 to 30 percent. The Malibu soil formed on uplands, in material weathered from shale and sandstone. It has slopes of 30 to 50 percent. For both soils, annual rainfall ranges from 14 to 20 inches; the average annual air temperature is 60° F.; and the frost-free season is about 270 to 325 days. Permeability is very slow. Runoff is rapid, and the erosion hazard is severe. The available water holding capacity is 1 inch to 4.5 inches in the 8 to 30 inches of effective rooting depth. Inherent fertility is medium to high.

These soils are used primarily for range and for watershed. The major limitations are the slope, the erosion hazard, and the fine-textured subsoil.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Seeding and fertilization of range are not practical. Brush control is beneficial in some areas and is especially needed on the Malibu soil. It increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIIe-8

This unit consists of very shallow to shallow, somewhat excessively drained to well-drained sandy loams, loams, and clay loams of the Gaviota, Hambright, Lodo, and Millsholm series. These soils have a substratum of sandy loam or clay loam. They formed on uplands and have slopes of 15 to 50 percent. All except the Millsholm soils are 2 to 10 percent rock outcrop. All except the Hambright soils formed in material weathered from sandstone and shale. The Hambright soils formed in material weathered from basic igneous rocks. Annual rainfall ranges from 15 to 22 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 300 days. Permeability is moderately rapid to moderately slow. Runoff is medium to very rapid, and the erosion hazard moderate to very severe. The available water holding capacity is 0.5 inch to 3.5 inches in the 6 to 20 inches of effective rooting depth. Inherent fertility is medium to low.

These soils are used for range and for watershed. The major limitations are the shallowness, the low water-holding capacity, the slope, and the erosion hazard.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Forage production is high during periods of favorable rainfall. Seeding and fertilization of range are not practical. Brush control is beneficial in some areas; it increases the amount of forage and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIIs-4

The one soil in this unit, Arnold sand, 9 to 50 percent slopes, is very deep and somewhat excessively drained. This soil formed on uplands, in material weathered from soft sandstone. Annual rainfall ranges from 14 to 20 inches; the average annual air temperature is 62° F.; and the frost-free season is 260 to 300 days. Permeability is rapid. Runoff is medium to rapid, and the erosion hazard is moderate to severe. The available water holding capacity is 3.6 to 4.8 inches in the 60 inches of effective rooting depth. Inherent fertility is low.

This soil is used for range and for watershed. The major limitations are the coarse texture, the low water-holding capacity, the slope, and the erosion hazard.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about 4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage.

Forage production is low, and seeding and fertilization of range are not practical. Brush control is especially important; it increases the amount of forage and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means, or, on selected sites, by controlled burning.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIIs-8

This unit consists of very shallow to shallow, well-drained loams of the Hambright and Millsholm series. These soils have a subsoil of clay loam. They are 10 to 25 percent rock outcrop. They formed on uplands and have slopes of 15 to 75 percent. The Hambright soil formed in material weathered from basic igneous rocks, and the Millsholm soil in material weathered from sandstone and shale. Annual rainfall ranges from 15 to 22 inches; the average annual air temperature is between 60° and 62° F.; and the frost-free season is about 250 to 300 days. Permeability is moderately slow to moderate. Runoff is rapid to very rapid, and the erosion hazard is severe to very severe. The available water holding capacity is 0.5 inch to 2 inches in the 6 to 20 inches of effective rooting depth. Inherent fertility is low to medium.

These soils are used for range and for watershed. The major limitations are the slope, the erosion hazard, the shallowness, and the rock outcrops.

Proper range management requires that grazing use be adjusted from season to season, according to the amount of forage produced. Maintaining a balance between the number of animals and the amount of forage is most important for perpetuation of the range, for maximum production, and for erosion control. Management practices that maintain or improve the vegetation are needed.

Continuous overstocking and heavy grazing result in soil deterioration and in undesirable changes in plant composition. Choice plants tend to disappear, weeds and brush spread, and litter and stubble are reduced to a minimum.

Livestock should be kept off the range at the start of the growing season, until the grass is about

4 inches high. If the vegetation is properly used, it generally has a patchy appearance at the end of the growing season. Enough vegetation should be left to protect the soil against erosion. Grazing should not be allowed until the soil is dry enough to support livestock without damage. Grazing when the soil is moist causes compaction, makes it difficult for seeds to become established, inhibits root development, and increases runoff and the erosion hazard.

Seeding and fertilization of range are not practical. Brush control is beneficial in some areas; it increases forage production and makes handling of livestock easier. The undesirable plants can be controlled by mechanical or chemical means. Fire protection is most important.

Fencing, salting, and establishing an adequate number of watering places make it easier to control the distribution of livestock.

Watersheds should be protected against fire and grazing animals.

Capability Unit VIIIe-1

This unit consists of Badland and Gullied land. For both, runoff is very rapid and the erosion hazard very severe. Other features vary.

These land types are used for watershed. They should not be used as range.

The major limitations are the slope and the erosion hazard. If barren, the soil material is easily eroded and produces large quantities of silt and debris. In some places small earthen dams can be built for erosion control. Fire protection is needed.

Capability Unit VIIIw-4

This unit consists of Coastal beaches and Riverwash. Both of these land types are very deep, sandy, gravelly, or stony and are subject to frequent flooding.

These land types are best suited to use as watershed and recreational areas.

The major limitations are the frequency of overflow, the coarse texture, the low available water holding capacity, and the erosion hazard. Channel alinement and streambank protection are most important in management. Stabilization of sand dunes with introduced beach grasses and native plants is suggested management for beach areas.

Capability Unit VIIIw-6

Tidal flats, which makes up this unit, consists of wet areas subject to tidal overflow. The soil material consists of highly stratified sediments that have been laid down in tidal lagoons and marshes.

These areas are generally unsuitable for farming. Some are idle, and some are used as wildlife habitat.

The major limitations are the frequency of overflow, the very poor drainage, and the salts. Reclamation is not considered feasible.

Capability Unit VIIIs-1

This unit consists of Igneous rock land, Pits and dumps, and Sedimentary rock land.

Generally these land types are suitable only for watershed. They should not be used as range.

The major limitations are the shallowness of the soil material and the erosion hazard. Fire protection is most important, not only in the management of these areas but also for the protection of downstream areas. Sanitary land fills and dumps make good parks and recreational areas if covered with good topsoil.

Crop Management

The management described in this section is that considered necessary to obtain the yields shown in table 5. The management practices and estimated yields are based on observations made by personnel of the Soil Conservation Service and the University of California Agricultural Extension Service 3/, and on the agricultural commissioner's annual report for Ventura County.

The estimated yields and suggested management are based on current technology and plant varieties. New developments in crop breeding, control of insects and diseases, irrigation methods, and other management practices will eventually make obsolete some of the practices suggested and yields predicted.

The estimates shown in table 5 are averages that can be expected over a period of years. In any given year, yields may be considerably higher or lower than the average. If little or no information was available on yield of a given crop on a particular soil, estimates were made by comparing this soil with similar soils for which yield information was available. Estimates for crops other than citrus fruits, avocados, and grain are not given for soils that have slopes of more than 9 percent. Neither are estimates given for miscellaneous land types or for soils not suitable for any of the crops listed in table 5. It is assumed that irrigation water is now available or can be made available for all arable soils.

In the pages that follow, the general management needed for each crop designated in table 5 is described, and the special management needed for this crop on several groups of soils that are suitable for this crop. The soils in any one group are similar in the special managment they require for the specified crop. Each group ordinarily contains all the soils of one or more capability units. In some instances, however, only some of the soils in

3/ B. W. Lee, director, Agricultural Extension Service, University of California, Ventura County, California, furnished technical assistance in preparing this section.

TABLE 5.--ESTIMATED AVERAGE ACRE YIELDS OF

[Figures indicate yields under high-level management. Absence of figure indicates

Map symbol	Soil	Irrigated crops				
		Avocados	Lima beans (dry)	Lima beans (green (processed)	Cabbage (green)	Celery
		40-lb. boxes	Tons	Tons	Tons	Tons
AcA	Anacapa sandy loam, 0 to 2 percent slopes-	325	1.2	2.3	15	34
AcC	Anacapa sandy loam, 2 to 9 percent slopes-	325	1.2	2.3	15	34
AnC	Anacapa gravelly sandy loam, 2 to 9 percent slopes	325	1.8	1.8	12	28
AuB	Azule loam, 0 to 5 percent slopes	300	.8	---	12	--
AuC2	Azule loam, 2 to 9 percent slopes, eroded-	300	.8	---	12	--
AuD	Azule loam, 9 to 15 percent slopes	---	1/ .4	---	--	--
AzC	Azule gravelly loam, 5 to 9 percent slopes	300	.8	---	--	--
Cc	Camarillo sandy loam	325	1.2	2.3	15	34
Cd	Camarillo loam	325	1.2	2.3	15	34
Ce	Camarillo loam, sandy substratum	325	1.2	2.3	15	34
CfD2	Castaic-Balcom complex, 9 to 15 percent slopes, eroded	300	1/ .4	---	--	--
CfE	Castaic-Balcom complex, 15 to 30 percent slopes	300	---	---	--	--
ChD2	Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded	---	---	---	--	--
CmD	Cibo clay, 5 to 15 percent slopes	---	1/ .4	---	--	--
CmE	Cibo clay, 15 to 30 percent slopes	---	---	---	--	--
CoA	Corralitos loamy sand, 0 to 2 percent slopes	350	1.0	1.8	14	28
CoC	Corralitos loamy sand, 2 to 9 percent slopes	350	1.0	1.8	14	28
CrC	Cortina stony sandy loam, 2 to 9 percent slopes	350	---	---	--	--
CsD	Cortina very stony sandy loam, 9 to 15 percent slopes	325	---	---	--	--
CyA	Cropley clay, 0 to 2 percent slopes	---	1.0	1.8	15	31
CyC	Cropley clay, 2 to 9 percent slopes	---	1.0	1.8	15	31
Cz	Cropley clay, calcareous variant	---	1.0	1.8	15	31
DbD	Diablo clay, 9 to 15 percent slopes	---	1/ .4	---	--	--
DbE	Diablo clay, 15 to 30 percent slopes	---	---	---	--	--
GaA	Garretson loam, 0 to 2 percent slopes	350	1.2	2.3	15	34
GaC	Garretson loam, 2 to 9 percent slopes	350	1.2	2.3	15	34
GbC	Garretson gravelly loam, 2 to 9 percent slopes	350	1.2	2.3	15	34
GcB	Garretson silt loam, calcareous variant, 2 to 5 percent slopes	---	1.2	2.3	15	34
GtD	Gilroy clay loam, 9 to 15 percent slopes--	---	---	---	--	--
GtE	Gilroy clay loam, 15 to 30 percent slopes-	---	---	---	--	--
Hm	Hueneme loamy sand, loamy substratum	---	1.0	1.8	14	28
Hn	Hueneme sandy loam	---	1.2	2.3	15	34
HuB	Huerhuero very fine sandy loam, 0 to 5 percent slopes	---	.8	---	12	--
HuC2	Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded	---	.8	---	--	--
HuD2	Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded	---	1/ .4	---	--	--
KmC2	Kimball sandy loam, 2 to 9 percent slopes, eroded	---	---	---	--	--
KmD2	Kimball sandy loam, 9 to 15 percent slopes, eroded	---	---	---	--	--

See footnote at end of table.

PRINCIPAL IRRIGATED CROPS AND DRYLAND CROPS

that the crop is not suited to or is not commonly grown on the soil specified]

Irrigated crops--Continued								Grain (dryland)
Lemons	Lettuce (head)	Oranges (navel)	Oranges (Valencia)	Peppers (pimiento)	Strawberries	Sugar beets	Tomatoes	
50-lb. boxes	Tons	50-lb. boxes	50-lb. boxes	Tons	Tons	Tons	Tons	Tons
800	10	650	750	7	23	33	25	0.9
800	10	650	750	7	23	33	25	.9
800	8	650	750	6	19	28	18	.9
750	8	750	750	-	--	28	18	1.0
750	8	750	750	-	--	28	18	1.0
750	--	750	750	-	--	--	--	1.0
750	--	750	750	-	--	--	18	1.0
800	10	---	---	7	23	33	25	.9
800	10	---	---	7	23	33	25	.9
800	10	---	---	7	23	33	25	.9
---	--	400	500	-	--	--	--	1.0
---	--	450	550	-	--	--	--	---
700	--	500	500	-	--	--	--	1.0
550	--	---	---	-	--	--	--	1.1
550	--	---	---	-	--	--	--	---
550	9	650	750	6	23	27	18	.9
550	9	650	750	6	23	27	18	.9
950	--	750	750	-	--	--	--	---
950	--	750	750	-	--	--	--	---
750	10	400	400	6	--	30	25	1.3
750	10	400	400	6	--	30	25	1.3
750	10	---	---	6	--	30	25	1.3
---	--	---	---	-	--	--	--	1.3
---	--	---	---	-	--	--	--	1.3
900	10	750	750	7	--	33	25	1.3
900	10	750	750	7	--	33	25	1.3
900	10	750	750	7	--	33	25	1.3
750	10	---	---	7	--	33	25	1.3
550	--	450	450	-	--	--	--	1.1
550	--	---	---	-	--	--	--	1.1
800	9	---	---	6	23	27	18	.9
800	10	---	---	7	23	28	25	.9
600	8	---	450	-	--	23	18	1.0
600	--	---	450	-	--	--	--	1.0
600	--	---	450	-	--	--	--	1.0
600	--	550	550	-	--	--	--	1.0
600	--	550	550	-	--	--	--	1.0

TABLE 5.--ESTIMATED AVERAGE ACRE YIELDS OF

Map symbol	Soil	Irrigated crops				
		Avocados	Lima beans (dry)	Lima beans (green (processed)	Cabbage (green)	Celery
		40-lb. boxes	Tons	Tons	Tons	Tons
LeD2	Linne silty clay loam, 9 to 15 percent slopes, eroded	---	1/0.4	---	--	--
LeE2	Linne silty clay loam, 15 to 30 percent slopes, eroded	---	---	---	--	--
LoD2	Los Osos clay loam, 9 to 15 percent slopes, eroded	---	1/ .4	---	--	--
LoE2	Los Osos clay loam, 15 to 30 percent slopes, eroded	---	---	---	--	--
McA	Metz loamy fine sand, 0 to 2 percent slopes	350	1.2	2.3	15	34
McC	Metz loamy fine sand, 2 to 9 percent slopes	350	1.2	2.3	15	--
MeA	Metz loamy sand, 0 to 2 percent slopes	350	.9	---	14	--
MeC	Metz loamy sand, 2 to 9 percent slopes	350	.9	---	14	--
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes	350	.9	2.3	15	34
MoA	Mocho loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
MoC	Mocho loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
MrC	Mocho gravelly loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
MsA	Mocho clay loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
MsB	Mocho clay loam, 2 to 5 percent slopes	300	1.2	2.3	15	34
NaD2	Nacimiento silty clay loam, 9 to 15 percent slopes, eroded	300	1/ .4	---	--	--
NaE2	Nacimiento silty clay loam, 15 to 30 percent slopes, eroded	300	---	---	--	--
NaF	Nacimiento silty clay loam, 30 to 50 percent slopes	300	---	---	--	--
OhA	Ojai very fine sandy loam, 0 to 2 percent slopes	300	---	---	--	--
OhC2	Ojai very fine sandy loam, 2 to 9 percent slopes, eroded	300	---	---	--	--
OhD2	Ojai very fine sandy loam, 9 to 15 percent slopes, eroded	300	---	---	--	--
OsD2	Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded	300	---	---	--	--
OsE2	Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded	---	---	---	--	--
Pa	Pacheco silty clay loam	---	1.0	1.8	15	28
PcA	Pico sandy loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
PcC	Pico sandy loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
PsA	Pico loam, sandy substratum, 0 to 2 percent slopes	300	1.2	2.3	15	34
RcC	Rincon silty clay loam, 2 to 9 percent slopes	300	1.2	---	12	--
RcD2	Rincon silty clay loam, 9 to 15 percent slopes, eroded	300	---	---	--	--
RcE2	Rincon silty clay loam, 15 to 30 percent slopes, eroded	300	---	---	--	--
RcE3	Rincon silty clay loam, 9 to 30 percent slopes, severely eroded	---	---	---	--	--
SaA	Salinas clay loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
SaC	Salinas clay loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
ScD2	San Benito clay loam, 9 to 15 percent slopes, eroded	300	1/ .4	---	--	--

See footnote at end of table.

PRINCIPAL IRRIGATED CROPS AND DRYLAND CROPS--Continued

Irrigated crops--Continued								Grain (dryland)
Lemons	Lettuce (head)	Oranges (navel)	Oranges (Valencia)	Peppers (pimiento)	Strawberries	Sugar beets	Tomatoes	
50-lb. boxes	Tons	50-lb. boxes	50-lb. boxes	Tons	Tons	Tons	Tons	Tons
700	--	550	550	-	--	--	--	1.1
700	--	550	550	-	--	--	--	1.1
450	--	---	550	-	--	--	--	1.1
450	--	---	550	-	--	--	--	---
600	10	650	650	7	23	30	25	1.0
600	10	650	650	7	23	33	25	1.0
600	9	650	650	6	23	27	18	.9
600	9	650	650	6	23	27	18	.9
600	10	650	650	7	23	30	25	.9
700	10	750	750	7	--	33	25	1.3
700	10	750	750	7	--	33	25	1.3
700	10	750	750	7	--	33	25	1.3
700	10	750	750	7	--	33	25	1.3
700	--	550	550	-	--	--	--	1.1
700	--	550	550	-	--	--	--	1.1
---	--	---	---	-	--	--	--	---
900	--	750	750	-	--	--	--	.9
900	--	750	750	-	--	--	--	.9
900	--	750	750	-	--	--	--	.9
900	--	750	750	-	--	--	--	---
900	--	750	750	-	--	--	--	---
750	10	---	---	6	--	23	20	1.3
750	10	650	750	7	23	30	25	.9
750	10	650	750	7	23	30	25	.9
750	10	650	750	7	23	30	25	.9
600	8	450	450	-	--	23	18	1.0
600	--	450	450	-	--	--	--	1.0
600	--	450	450	-	--	--	--	1.0
600	--	450	450	-	--	--	--	---
900	10	750	750	7	--	30	25	1.3
900	10	750	750	7	--	30	25	1.3
700	--	500	500	-	--	--	--	1.1

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TABLE 5.--ESTIMATED AVERAGE ACRE YIELDS OF

Map symbol	Soil	Irrigated crops				
		Avocados	Lima beans (dry)	Lima beans (green (processed)	Cabbage (green)	Celery
		40-lb. boxes	Tons	Tons	Tons	Tons
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded	300	---	---	--	--
ScF2	San Benito clay loam, 30 to 50 percent slopes, eroded	300	---	---	--	--
SeE	Santa Lucia shaly silty clay loam, 15 to 30 percent slopes	---	1/0.4	---	--	--
ShE	Saugus sandy loam, 5 to 30 percent slopes	300	---	---	--	--
SoE2	Sespe clay loam, 15 to 30 percent slopes, eroded	---	---	---	--	--
SsE2	Soper loam, 15 to 30 percent slopes, eroded	300	---	---	--	--
SwA	Sorrento loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
SwC	Sorrento loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
SxA	Sorrento silty clay loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
SxC	Sorrento silty clay loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
SzC	Sorrento clay loam, heavy variant, 2 to 9 percent slopes	300	1.2	---	--	--
SzD	Sorrento clay loam, heavy variant, 9 to 15 percent slopes	300	1/ .8	---	--	--
VaA	Vina loam, 0 to 2 percent slopes	300	1.2	2.3	15	34
VaC	Vina loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
VnC	Vina gravelly loam, 2 to 9 percent slopes	300	1.2	2.3	15	34
VsC	Vina silty clay loam, 2 to 9 percent slopes	---	1.2	2.3	15	34
ZmC	Zamora loam, 2 to 9 percent slopes	300	1.2	---	12	--
ZmD2	Zamora loam, 9 to 15 percent slopes, eroded	300	1/ .8	---	--	--

1/ Nonirrigated.

PRINCIPAL IRRIGATED CROPS AND DRYLAND CROPS--Continued

Irrigated crops--Continued								Grain (dryland)
Lemons	Lettuce (head)	Oranges (navel)	Oranges (Valencia)	Peppers (pimiento)	Strawberries	Sugar beets	Tomatoes	
50-lb. boxes	Tons	50-lb. boxes	50-lb. boxes	Tons	Tons	Tons	Tons	Tons
700	--	500	500	-	--	--	--	---
---	--	---	---	-	--	--	--	---
700	--	---	---	-	--	--	--	1.1
600	--	400	400	-	--	--	--	---
550	--	450	450	-	--	--	--	---
700	--	500	500	-	--	--	--	---
900	10	700	700	7	--	30	25	1.3
900	10	700	700	7	--	30	25	1.3
900	10	700	700	7	--	30	25	1.3
900	10	700	700	7	--	30	25	1.3
800	--	700	700	-	--	30	--	1.3
800	--	700	700	-	--	--	--	1.3
900	10	700	700	7	--	30	25	1.3
900	10	700	700	7	--	30	25	1.3
900	10	700	700	7	--	30	25	1.3
900	10	700	700	7	--	30	25	1.3
900	8	700	700	-	--	23	18	1.2
900	--	700	700	-	--	--	--	1.2

a given capability unit are suitable for the crop. In such situations, the map symbol for the soil or soils suitable is listed for that capability unit.

All requirements for plant nutrients are for the elemental form; for example, pounds per acre of the element phosphorus. The gross irrigation requirement is the total annual plant need per acre less the average effective precipitation. The irrigation requirement is calculated on the assumption that the irrigation system is 70 percent efficient.

Avocados

Typical plantings of avocados are 132 trees per acre for the Bacon variety, and 90 trees per acre for the Hass variety. Trees begin to return a profit in 5 years. Harvesting is done by hand.

Avocado trees are grown under a nontillage program (see pl. II). Weeds are controlled by spraying with herbicides. Insects are controlled primarily by biological means; insecticides are used occasionally. Nitrogen is applied annually to mature orchards at the rate of 100 to 150 pounds per acre. Foliar applications of zinc are generally needed. Applications of iron are needed if the soils are strongly calcareous.

Irrigation management is most important. The gross irrigation requirement for avocados is 2.5 acre-feet of water. Furrows and sprinklers are used for irrigating.

Avocado root rot, for which there is no cure, is the most serious disease of avocados in the Area. This is a soil-borne fungus, associated with wetness, that is carried to uninfected areas by surface or subsurface drainage water.

Sensitivity to frost is a hazard. Both the tree and the fruit are likely to be damaged if the temperature drops below freezing. To some degree the temperature can be controlled by wind machines and orchard heaters.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-1 are in this group. Irrigation water is applied by sprinklers 12 times a year or by furrows eight times a year. Furrows are shortest on the sandy loams and longest on the silty clay loams.

Group 2.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Trees are planted in square blocks, across the slope, or on the contour. Irrigation water is applied by sprinklers or by furrows on the contour 9 to 13 times a year.

Group 3.--Soils of capability units IIe-1, IIe-3, IIIe-1, and IIIe-3 are in this group. Trees are planted across the slope or on the contour. Irrigation water is applied by sprinklers or by furrows on the contour. It is applied slowly to the soils of units IIe-3 and IIIe-3 because they take water slowly.

Group 4.--Soils Cc, Cd, and Ce of capability unit IIw-2 are in this group. Tile drains or open ditches are used to keep the water table below the tree roots. About 3 feet of excess irrigation water is applied each year. The excess water is used to leach salts down below the root zone.

Group 5.--Soils of capability units IVe-1 and VIe-1 and soil RcE2 in unit IVe-3 are in this group. Trees are planted in blocks, on terraces, or on the contour. Irrigation water is applied by sprinklers or furrows. It is applied slowly to soil RcE2 because this soil takes water slowly.

Group 6.--Soils of capability units IVe-7 and IVs-7 are in this group. Some stone removal is needed before planting. Trees are planted in blocks, on terraces, or on the contour. Irrigation water is applied 13 or 14 times a year. Sprinklers are used on soil CrC, and sprinklers and contour furrows on soil OsD2.

Group 7.--Soils of capability unit VIs-7 are in this group. Considerable stone removal is needed before planting. Trees are planted on the contour. Irrigation water is applied by sprinklers 13 or 14 times a year.

Lima Beans (Dry)

Lima beans are planted early in May, at the rate of 100 pounds of seed per acre. They are harvested in September. They are cut, windrowed, allowed to dry for 2 to 4 weeks, and then threshed.

Cultural practices include disking and harrowing and preparing a seedbed. Particular care is needed in preparing a seedbed that has a dry surface mulch and is not compacted in the uppermost 6 inches. As the seeds germinate, they are pushed out on the surface, and they decay if the soil is too wet. Weeds are controlled by applying herbicides to the soil before planting time and by cultivating or hand hoeing during the growing season. Diseases are controlled by treating the seeds and by using fungicides. Insects are controlled by sprays and dust, and nematodes by soil fumigation every 2 to 3 years. Little or no commercial fertilizer is applied.

The gross irrigation requirement for dry lima beans is 1 acre-foot of water. Furrows are used for irrigating. Fields are irrigated before they are seeded.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied once or twice during the growing season. Irrigation runs are shortest on the loams and longest on the clays.

Group 2.--Soils of capability units IIe-3, IIe-5, IIIe-1, and IIIe-5, soils AuC2, AzC, and HuB in unit IIIe-3, and soil HuC2 in unit IVe-3 are in this group. All are irrigated except the soils in units IIIe-1 and IIIe-5. Irrigation water is applied two or three times during the growing season. It is applied slowly because of fine texture and slow or very slow permeability. Irrigation runs are shortes on the very fine sandy loams and longest on the clays. On soils AuC2, AzC, HuB, and HuC2, furrows are laid out across the slope or on the contour. All tillage is done across the slope.

Group 3.--Soils of capability units IIs-4, IIIs-4

Terraced lemon plantings on San Benito clay loam, 15 to 30 percent slopes, eroded, and contoured plantings on Sorrento silty clay loam, 2 to 9 percent slopes. The San Benito soil is in capability unit IVe-1, and the Sorrento soil is in unit IIe-1.

Foreground: Nontilled avocado orchard on terraced Rincon silty clay loam, 9 to 15 percent slopes.
Background: Lemon orchard on Sorrento loam, 0 to 2 percent slopes.

PLATE III

Foreground: Lemons on Cibo clay, 5 to 15 percent slopes. Center: Lemons on Vina silty clay loam, 2 to 9 percent slopes. Background: Range on Hambright very rocky loam, 15 to 75 percent slopes.

Stocks, a specialty crop grown for the fresh flower market, on Camarillo loam. This soil is in capability unit IIw-2.

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and IIIs-0 are in this group. Irrigation water is applied three or four times during the growing season. On soils CoC and MeC, furrows are laid out across the slope.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is about 1.5 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Group 5.--Soil SeE in capability unit IVe-1 and soils AuD and HuD2 in unit IVe-3 are in this group. None of these soils are irrigated. All tillage is done on the contour.

Lima Beans (Green Processed)

Green lima beans are climatically suited to the Oxnard Plain. Planting begins late in April and extends through June. The growing season is about 100 days. The crop is harvested mechanically.

Cultural practices include disking and harrowing and preparing a seedbed. Nitrogen is injected into the soil annually before planting time at the rate of 100 pounds per acre. Diseases are controlled by treating the seeds and by using fungicides. Insects are controlled by sprays and dust, and nematodes by soil fumigation every 2 or 3 years.

The gross irrigation requirement for green lima beans is 1.5 acre-feet of water. Furrows are used for irrigating. Fields are irrigated before they are seeded.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied once or twice during the growing season. Irrigation runs are shortest on the loams and longest on the clays.

Group 2.--Soils of capability units IIe-1 and IIe-5 are in this group. Irrigation water is applied once or twice during the growing season. All tillage is done across the slope.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Irrigation water is applied three or four times during the growing season. On soils CoC and MeC, furrows are laid out across the slope or on the contour.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is about 2 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Cabbage (Green)

Cabbage is climatically suited to the Oxnard Plain. Planting is done between August and January, at the rate of 1 to 2 pounds of seed per acre. The crop is harvested by hand, between November and June.

Cultural practices include plowing, disking, rolling, landplaning, spring-tooth harrowing, furrowing, and shaping seedbeds. About 100 pounds of nitrogen and 26 pounds of phosphorus are applied per acre. Weeds are controlled by applying herbicides to the soil before planting time and then by cultivating or hand hoeing during the growing season. Insects are controlled by applying insecticides.

The gross irrigation requirement for cabbage is 1.5 acre-feet of water. Furrows are used for irrigating.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied once before the seed germinates and then three times during the growing season. Irrigation runs are shortest on the loams and longest on the clays.

Group 2.--Soils of capability units IIe-1, IIe-3, and IIe-5 and soils AuC2 and HuB in unit IIIe-3 are in this group. Irrigation water is applied four times during the growing season. It is applied slowly to the soils in capability units IIe-3, IIe-5, and IIIe-3. Furrows are laid out on the contour or across the slope. All tillage is done across the slope.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Irrigation water is applied four or five times during the growing season. On soils CoC and MeC, furrows are laid out across the slope or on the contour.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is 2 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Celery

Celery is climatically suited to the Oxnard Plain. Celery transplants are set out during a period that extends from August through March. Planting is scheduled so that harvesting is continuous and uniform. Harvesting is done by hand, from early in November through the middle of July.

Cultural practices include applying manure, plowing, disking, rolling, landplaning, spring-tooth harrowing, furrowing, and shaping seedbeds. About 400 pounds of nitrogen, 90 pounds of phosphorus, and 80 pounds of potassium are applied per acre. Manure is commonly applied before the transplants are set out, at the rate of 10 tons per acre. Diseases are controlled by treating the seeds and by using fungicides, and worms by applying insecticides. Weeds are controlled by applying selective herbicides after the transplants are set out and by cultivating and hand hoeing.

The gross irrigation requirement for celery is about 2 acre-feet of water. Furrows are used for irrigating.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied 10 times during the growing season. Runs are shortest on the sandy loams and longest on the clays.

Group 2.--Soils of capability units IIe-1, IIe-3, and IIe-5 are in this group. Irrigation water is applied 10 times during the growing season. All tillage is done across the slope.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Irrigation water is applied 10 to 12 times during the growing season. On soils CoC and MeC, furrows are laid out across the slope or on the contour.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is about 2.5 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Grain (Dryland)

Yields of dryland grain depend on rainfall and on the water-holding capacity of the soil. Therefore, grain grows best during periods of favorable rainfall, on soils that have a high water-holding capacity. Usually it is grown year after year in the same field. Occasionally, it is rotated with sudangrass. Barley and oats are planted during a period that extends from the middle of November to early in February, at the rate of 80 pounds of seed per acre. The grain is harvested by combine in July and is used for livestock feed. During periods of low rainfall, the grain is not harvested but is grazed in the field.

Cultural practices include disking, spring-tooth harrowing, and spike-tooth harrowing. Nitrogen is applied at the rate of 40 pounds per acre. Weeds are controlled by spraying with 2-4-D when the grain is about 6 inches tall. Smut is controlled by treating the seeds, and barley foot rot by rotation. No insect control is used.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1, IIs-1, IIs-4, IIs-5, IIw-2, IIw-5, IIIs-0, and IIIs-4 are in this group. The general management described in the foregoing paragraphs is applicable to these soils.

Group 2.--Soils of capability units IIe-1, IIe-3, IIe-5, IIIe-1, IIIe-3, IIIe-5, IVe-1, and IVe-3 are in this group. All tillage is done across the slope or on the contour.

Lettuce (Head)

Lettuce is climatically suited to the Oxnard Plain. It is planted at the rate of 1 pound of seed per acre. About two-thirds of the acreage is planted during a period that extends from November to March and is harvested late in March through June. The rest is planted late in August and is harvested in October and November. Lettuce is harvested by hand.

Cultural practices include plowing, disking, rolling, landplaning, spring tooth harrowing, furrowing, and shaping seedbeds. About 120 pounds of nitrogen, 26 pounds of phosphorus, and 30 pounds of potassium are applied per acre. Fertilizer is placed under and near the seed at the time of planting. Additional nitrogen is applied as a side dressing or in irrigation water during the season. Weeds are controlled by applying herbicides to the soil before planting time and by hand hoeing during the growing season. Diseases are controlled by using resistant seed varieties and disease-free seed. Insects and worms are controlled by insecticide sprays.

The gross irrigation requirement for lettuce is 1.5 acre-feet of water. Furrows are used for irrigating. Runs are shortest on the loams and longest on the clays.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied once before the seed germinates and twice during the growing season.

Group 2.--Soils of capability units IIe-1, IIe-3, and IIe-5 and soil HuB in unit IIIe-3 are in this group. All tillage is done across the slope. Furrows are laid out on the contour or across the slope. Irrigation water is applied three times during the growing season. It is applied slowly to the soils in units IIe-3, IIe-5, and IIIe-3.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. On soils CoC and MeC, furrows are laid out across the slope or on the contour. Irrigation water is applied four or five times during the growing season.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is about 2 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Oranges and Lemons

Lemons are generally planted 90 to 110 trees per acre (see pl. III), and oranges 180 trees per acre. Trees begin to return a profit in about 5 years. Harvesting is done by hand clippers. Navel oranges are harvested from December through April, and Valencias from May through November. Lemons are harvested five to eight times throughout the year.

Citrus trees are sensitive to frost. Both the tree and the fruit are likely to be damaged if the temperature drops below freezing. To some degree the temperature can be controlled by wind machines and orchard heaters. Lemons require fewer thermal heat units than oranges do and can therefore be grown in the colder coastal parts of the Area. They are suited to the climate of the Oxnard Plain. Navel oranges require more thermal heat units than Valencias do and

are limited to the interior valleys near Piru, Fillmore, and Ojai. Valencias grow in the intermediate zone between the coast and the interior valleys.

Some newly planted orchards are intercropped with dry lima beans, other vegetables, or flowers (see pl. III) for the first 2 or 3 years. Nitrogen fertilizer is applied annually. Lemons require approximately 1 to 3 pounds of nitrogen per tree, and oranges, 1 to 2 pounds. Deficiencies of zinc and manganese are corrected by adding these elements to an insecticide and spraying once a year. Occasionally, foliar applications of copper are needed in some areas. Weeds are controlled by nontillage chemical means in about 60 percent of the citrus orchards in the Area, and by clean cultivation or by summer tillage and winter cover crops on the rest. Virus diseases are best controlled by bud selection. Brown rot is controlled by copper sprays. Gummosis lesions on tree trunks require surgery and treatment with bordeaux paint. Scale, mites, aphids, and thrips are controlled by chemical sprays. Lemon trees are hand pruned every other year and mechanically topped on alternate years. Oranges require very little pruning except topping and hedging in crowded orchards.

The gross irrigation requirement for citrus trees is about 3 acre-feet of water.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1, IIs-1, and IIs-5 are in this group. Furrows, permanent sprinklers, or dragline hoses and sprinklers are used for irrigating. Six to ten applications of water are needed each year.

Group 2.--Soils of capability units IIe-1, IIe-3, IIe-5, IIIe-1, and IIIe-3, and soil CmD in unit IIIe-5 are in this group. All tillage and planting are done across the slope or on the contour. Irrigation water is applied by sprinklers or by furrows laid out on the contour. It is applied slowly to the soils in units IIe-3, IIIe-3, IIe-5, and IIIe-5 because these soils take water slowly.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Irrigation water is applied by sprinklers or furrows seven to eleven times a year. On soils CoC and MeC, furrows and plantings are laid out across the slope or on the contour.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. They are on the Oxnard Plain, which is climatically suited to lemons. Tile drains or open ditches are used to keep the water table below the tree roots. In areas affected by excess salts, the gross irrigation requirement is about 3.5 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Group 5.--Soils of capability units IVe-1 and IVe-3, soil CmE in unit IVe-5, soils of unit VIe-1, and soil RcE2 in unit VIe-3 are in this group. Trees are planted on terraces and irrigated by sprinklers or furrows. Water is applied slowly to soils in units IVe-3, IVe-5, and VIe-3 because they take water slowly.

Group 6.--Soils of capability units IVs-7, IVe-7, and VIe-7 are in this group. Some stone removal is needed before planting. Trees are grown on the contour or on terraces. Irrigation water is applied eight to twelve times a year. Sprinklers are used on soil CrC, and sprinklers and contour furrows on soils OsD2 and OsE2.

Group 7.--Capability unit VIs-7 makes up this group. Trees are grown on the contour and are irrigated by sprinklers seven to eleven times a year. Stones must be removed before trees can be planted.

Peppers (Pimiento)

Pimiento peppers are climatically suited to the Oxnard Plain. They are planted late in March or early in April, at the rate of 3 pounds of seed per acre. They are harvested by hand, two or three times during the season.

Cultural practices include plowing, disking, landplaning, spring-tooth harrowing, drag harrowing, and furrowing. About 150 pounds of nitrogen and 26 pounds of phosphorus are applied per acre. Weeds are controlled by using a push hoe before the seedlings emerge. Further hoeing or cultivation is done as needed throughout the growing season. Nematodes are controlled by soil fumigation before planting.

The gross irrigation requirement is 1.5 acre-feet of water. Furrows are used for irrigating.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied three times during the growing season. Irrigation runs are shortest on the loams and longest on the clays.

Group 2.--Soils of capability units IIe-1 and IIe-5 are in this group. All tillage is done across the slope. Irrigation water is applied three times a season. Furrows are laid out on the contour or across the slope.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Irrigation water is applied four or five times during the growing season. On soils CoC and MeC, furrows are laid out across the slope or on the contour.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is about 2 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Strawberries

Strawberries are climatically suited to the Oxnard Plain. Transplants are set out in August or early in September. Berries are harvested by hand, from March through the middle of July.

Cultural practices include deep plowing, disking, chiseling, smoothing, and harrowing. The soil is fumigated and covered with plastic. The plastic is

removed, double-row beds are prepared, and the transplants are set out. Fields are sprinkler irrigated every second or third day during the first 5 months. Then a second plastic layer is applied, slits are made, and the plants are pulled through. From this time on, irrigation is by furrows until harvesting time. A complete fertilizer of 450 pounds of nitrogen, 90 pounds of phosphorus, and 200 pounds of potassium is used. Fertilizer is applied as a sidedressing or topdressing until the plastic cover is laid down and then is applied in the irrigation water or in the furrows. Diseases, nematodes, and weeds are controlled by fumigation and by the plastic cover. Mites are controlled by spraying.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils AcD, AnC, and PcC in capability unit IIe-1 are in this group. The gross irrigation requirement for these soils is 7 acre-feet of water.

Group 2.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. The gross irrigation requirement is about 8 acre-feet of water. Furrows are laid out across the slope or on the contour if the slope exceeds 1 percent.

Group 3.--Soils Cc, Cd, Ce, Hm, Hn in unit IIw-2 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. The gross irrigation requirement is 8.5 acre-feet of water. The excess water is needed to leach salts from the soil. Strawberries are sensitive to salts. Even a slight concentration of salts significantly reduces yields.

Sugar Beets

Sugar beets are planted in dry soil, at the rate of about 6 pounds of seed per acre. They are planted during a period that extends from December through March and are harvested mechanically, from August through October.

Cultural practices include plowing, disking, rolling, landplaning, spring-tooth harrowing, applying fertilizer and herbicides, and shaping seedbeds. About 150 pounds of nitrogen is applied. The supply of phosphorus and potassium is generally adequate. Weeds are controlled by spraying chemicals and by cultivating and hand hoeing. Root-knot nematodes are controlled by fumigation. Sugar-beet nematodes are controlled by not growing sugar beets or cole crops for 4 or 5 years, thus depriving the nematode of a host plant.

The gross irrigation requirement for sugar beets is 2 acre-feet of water. Furrows are used for irrigating.

Specific factors in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. Irrigation water is applied five times during the growing season. Runs are shortest on the loams and longest on the clays.

Group 2.--Soils of capability units IIe-1, IIe-3, and IIe-5 and soils AuC2 and HuB in unit IIIe-3 are in this group. All tillage is done across the slope. Furrows are laid out on the contour or across the slope. Irrigation water is applied five times during the growing season. It is applied slowly to soils in units IIe-3, IIe-5, and IIIe-3.

Group 3.--Soils of capability units IIs-4, IIIs-4, and IIIs-0 are in this group. Irrigation water is applied six or seven times during the season. On soils CoC and MeC, furrows are laid out across the slope or on the contour.

Group 4.--Soils of capability units IIw 2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. Sugar beets are salt tolerant when ma ture but are sensitive during germination. Additional water is needed to leach excess salts from the soil early in the growing season. The gross irrigation requirement is about 2.5 acre-feet of water. Irrigation runs are shortest on the sandy loams and longest on the clays.

Tomatoes

Tomatoes are climatically suited to the Oxnard Plain. They are generally planted during a period that extends from March through May, at the rate of half a pound of seed per acre. They are harvested from August through October. Tomatoes are used for the fresh market, for canning, and for seed. Those for the fresh market are harvested by hand, and those for canning, by machine.

Cultural practices include plowing, disking, rolling, spring-tooth harrowing, drag harrowing, furrowing, and shaping seedbeds. Residual fertilizers from winter vegetables are generally sufficient for a satisfactory tomato crop, but 75 to 100 pounds of nitrogen and 18 pounds of phosphorus per acre are commonly added as a sidedressing before the plants are half grown. Weeds are controlled by incorporating a herbicide into the soil at the time of planting and then by cultivating and hand hoeing during the growing season. Verticillium wilt is controlled by planting resistant varieties. Worms and mites are controlled by spraying, and root-knot nematodes by fumigating the soil.

Generally the gross irrigation requirement is 1.5 acre-feet of water. Furrows are used for irrigating. Water is applied once before germination and twice during the growing season.

Specific factors important in management for groups of soils, by capability units, follow.

Group 1.--Soils of capability units I-1 and IIs-5 are in this group. The foregoing general management described is applicable to these soils. Irrigation runs are shortest on the loams and longest on the clays.

Group 2.--Soils of capability units IIe-1, IIe-3, IIe-5, and IIIe-3 are in this group. All tillage is done across the slope. Furrows are laid out on the contour or across the slope. Irrigation water is applied three times during the growing season. It is applied slowly to soils in units IIe-3, IIe-5, and IIIe-3.

Group 3.--Soils of capability units IIs-4, IIIs-4,

and IIIs-0 are in this group. On soils CoC and MeC, furrows are laid out across the slope or on the contour. Irrigation water is applied four or five times during the growing season.

Group 4.--Soils of capability units IIw-2 and IIw-5 are in this group. Tile drains or open ditches are used to keep the water table below the root zone. In areas affected by excess salts, the gross irrigation requirement is about 2 acre-feet of water. The additional water is needed to leach salts from the soil. Irrigation runs are shortest on the sandy loams and longest on the clays.

Storie Index 4/

In table 6 the soils of the Area are listed in alphabetic order and are rated according to the Storie index (8). This index expresses numerically the relative degree of suitability, or value, of a soil for general intensive farming. The rating is based on soil characteristics only. It does not take into account other factors, such as availability of water for irrigation, climate, and distance from markets, which might determine the desirability of growing specific crops in a given locality. For these reasons, the index, in itself, cannot be considered an index for land valuation.

Four factors that represent the inherent characteristics and qualities of the soil are considered in the index rating. Each factor is rated or evaluated separately in terms of percentage of the ideal, or 100 percent. The factors are:

Factor A, Profile characteristics. Factor A expresses relative suitability of a profile for the growth of plant roots. Soils that have deep permeable profiles are rated 100 percent. Those that have a dense clay layer or a hardpan or are shallow over bedrock are rated less than 100 percent. The rating depends upon the extent to which root penetration is limited.

Factor B, Texture of the surface soil. Factor B is rated according to the texture of the surface soil, which affects the ease of tillage and the capacity of the soil to hold water. The moderately coarse and medium textures--fine sandy loam, loam, and silt loam--are the most desirable and are rated as 100 percent. The coarser and finer textures, such as sand and clay, are rated less than 100 percent.

Factor C, Slope. Factor C is particularly important if the soil is irrigated. The amount of water that runs off a soil and the susceptibility of the soil to erosion are influenced by slope. Smooth, nearly level or very gently sloping soils are rated 100 percent. The rating decreases as the slope increases.

Factor X, Other conditions. Factor X is used to evaluate any limitations to use of the soil, such as poor drainage or a high water table, erosion, salts or alkali, low fertility, acidity, or unfavorable microrelief. If more than one limitation exists, the values are multiplied together to get the X factor.

The index rating of a soil is obtained by multiplying the four factors A, B, C, and X; thus, any one factor may dominate or control the final rating. For example, a soil may have an excellent profile justifying a rating of 100 percent for factor A, excellent texture of the surface soil justifying 100 percent for factor B, a smooth, nearly level surface justifying 100 percent for factor C, but a high accumulation of salts or alkali that would give a rating of 20 percent for factor X. Multiplying these four ratings gives an index rating of 20 for this soil. The high accumulation of salts or alkali dominates, makes the soil unproductive for crops, and justifies the low index rating of 20.

Soils are placed in grades according to their suitability for farm crops as shown by their Storie index ratings. The six grades and their range in index ratings are--

	Index rating
Grade 1	80 to 100
Grade 2	60 to 80
Grade 3	40 to 60
Grade 4	20 to 40
Grade 5	10 to 20
Grade 6	Less than 10

Soils of grade 1 have few or no limitations that restrict their use for crops. Soils of grade 2 are suitable for most crops and have few special management needs, but they have minor limitations that narrow the choice of crops. Grade 3 soils are suited to a few crops or to special crops and require special management. Grade 4 soils are severely limited for crops. If used for crops, they require careful management. Grade 5 soils are not suited to cultivated crops but can be used for pasture and range. Grade 6 consists of soils and land types that generally are not suited to farming.

4/ Dr. Frank Harradine, professor of soil morphology, Department of Soils and Plant Nutrition, University of California, Davis, California.

TABLE 6.--STORIE INDEX RATING FOR SOILS OF THE VENTURA AREA

Map symbol	Soil	Storie index					
		Rating factors				Index rating	Soil grade
		A (Profile)	B (Texture)	C (Slope)	X (Other conditions)		
AcA	Anacapa sandy loam, 0 to 2 percent slopes	100	95	100	100	95	1
AcC	Anacapa sandy loam, 2 to 9 percent slopes	100	95	90	100	86	1
AnC	Anacapa gravelly sandy loam, 2 to 9 percent slopes	100	60	90	100	54	3
AsF	Arnold sand, 9 to 50 percent slopes	65	60	65	68	20	5
AuB	Azule loam, 0 to 5 percent slopes	70	100	95	95	63	2
AuC2	Azule loam, 2 to 9 percent slopes, eroded	75	100	90	80	54	3
AuD	Azule loam, 9 to 15 percent slopes	70	100	85	95	56	3
AzC	Azule gravelly loam, 5 to 9 percent slopes	70	75	90	95	45	3
BdG	Badland	---	---	---	---	<10	6
CaE2	Calleguas shaly loam, 9 to 30 percent slopes, eroded	45	80	80	80	23	4
CaF	Calleguas shaly loam, 30 to 50 percent slopes	40	80	40	65	8	6
CbF2	Calleguas-Arnold complex, 30 to 50 percent slopes, eroded:						
	Calleguas	45	70	40	80	10	5
	Arnold	65	60	65	80	20	5
Cc	Camarillo sandy loam	100	95	100	75	71	2
Cd	Camarillo loam	100	100	100	75	75	2
Ce	Camarillo loam, sandy substratum	95	100	100	75	71	2
CfD2	Castaic-Balcom complex, 9 to 15 percent slopes, eroded:						
	Castaic	70	90	85	80	43	3
	Balcom	60	100	85	80	41	3
CfE	Castaic-Balcom complex, 15 to 30 percent slopes:						
	Castaic	70	90	75	75	35	4
	Balcom	60	100	75	85	38	4
CfF2	Castaic-Balcom complex, 30 to 50 percent slopes, eroded:						
	Castaic	70	90	40	65	16	5
	Balcom	60	100	40	65	16	5
CfG2	Castaic-Balcom complex, 50 to 65 percent slopes, eroded:						
	Castaic	70	90	20	65	8	6
	Balcom	60	100	20	65	8	6
CgG2	Castaic and Saugus soils, 30 to 75 percent slopes, eroded:						
	Castaic	70	90	20	65	8	6
	Saugus	75	95	30	60	13	5
ChD2	Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded	35	95	85	80	23	4
CkE3	Chesterton sandy loam, 9 to 30 percent slopes, severely eroded	25	95	80	65	12	5
CmD	Cibo clay, 5 to 15 percent slopes	80	60	85	90	37	4
CmE	Cibo clay, 15 to 30 percent slopes	70	60	75	85	27	4
CnB	Coastal beaches	---	---	---	---	<5	6
CoA	Corralitos loamy sand, 0 to 2 percent slopes	85	75	100	100	64	2
CoC	Corralitos loamy sand, 2 to 9 percent slopes	85	75	90	100	57	3

TABLE 6.--STORIE INDEX RATING FOR SOILS OF THE VENTURA AREA--Continued

Map symbol	Soil	Storie index					
		Rating factors				Index rating	Soil grade
		A (Profile)	B (Texture)	C (Slope)	X (Other conditions)		
CrC	Cortina stony sandy loam, 2 to 9 percent slopes	85	50	90	70	27	4
CsD	Cortina very stony sandy loam, 9 to 15 percent slopes	85	50	85	70	25	4
CyA	Cropley clay, 0 to 2 percent slopes	95	60	100	100	57	3
CyC	Cropley clay, 2 to 9 percent slopes	95	60	90	100	51	3
Cz	Cropley clay, calcareous variant	95	60	100	80	46	3
DbD	Diablo clay, 9 to 15 percent slopes	70	60	85	80	29	4
DbE	Diablo clay, 15 to 30 percent slopes	70	60	75	85	27	4
DbF	Diablo clay, 30 to 50 percent slopes	65	60	40	80	12	5
Fd	Fill land	---	---	---	---	<10	6
GaA	Garretson loam, 0 to 2 percent slopes	100	100	100	100	100	1
GaC	Garretson loam, 2 to 9 percent slopes	100	100	90	100	90	1
GbC	Garretson gravelly loam, 2 to 9 percent slopes	100	70	90	100	63	2
GcB	Garretson silt loam, calcareous variant, 2 to 5 percent slopes	100	100	95	100	95	1
GrF	Gaviota rocky sandy loam, 15 to 50 percent slopes	20	60	60	56	6	6
GsE	Gazos silty clay loam, 15 to 30 percent slopes	80	90	75	85	46	3
GsF	Gazos silty clay loam, 30 to 50 percent slopes	80	90	40	80	23	4
GsG	Gazos silty clay loam, 50 to 75 percent slopes	80	90	20	65	9	6
GtD	Gilroy clay loam, 9 to 15 percent slopes	75	85	85	80	43	3
GtE	Gilroy clay loam, 15 to 30 percent slopes	75	85	75	75	36	4
GvF	Gilroy very rocky clay loam, 15 to 50 percent slopes	75	65	60	80	23	4
GxG	Gullied land	---	---	---	---	<10	6
HaG	Hambright very rocky loam, 15 to 75 percent slopes	30	60	20	90	3	6
HbF	Hambright rocky clay loam, 30 to 50 percent slopes	35	85	40	90	11	5
Hm	Hueneme loamy sand, loamy substratum	90	75	100	70	47	3
Hn	Hueneme sandy loam	95	90	100	70	60	2
HuB	Huerhuero very fine sandy loam, 0 to 5 percent slopes	55	100	95	95	50	3
HuC2	Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded	55	100	90	85	42	3
HuD2	Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded	55	100	85	80	37	4
HuE3	Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded	55	100	80	70	31	4
IrG	Igneous rock land	---	---	---	---	<10	6
KmC2	Kimball sandy loam, 2 to 9 percent slopes, eroded	50	95	90	85	36	4
KmD2	Kimball sandy loam, 9 to 15 percent slopes, eroded	50	95	85	80	32	4

TABLE 6.--STORIE INDEX RATING FOR SOILS OF THE VENTURA AREA--Continued

Map symbol	Soil	Storie index					
		Rating factors				Index rating	Soil grade
		A (Profile)	B (Texture)	C (Slope)	X (Other conditions)		
LaF	Landslides	---	---	---	---	<5	6
LeD2	Linne silty clay loam, 9 to 15 percent slopes, eroded	65	85	85	80	38	4
LeE2	Linne silty clay loam, 15 to 30 percent slopes, eroded	65	85	75	75	31	4
LeF2	Linne silty clay loam, 30 to 50 percent slopes, eroded	60	85	40	65	13	5
LkF	Lodo rocky loam, 30 to 50 percent slopes	40	85	40	75	10	5
LoD2	Los Osos clay loam, 9 to 15 percent slopes, eroded	70	85	85	100	51	3
LoE2	Los Osos clay loam, 15 to 30 percent slopes, eroded	70	85	75	75	33	4
LoF	Los Osos clay loam, 30 to 50 percent slopes	70	85	40	65	15	5
MaD2	Malibu loam, 9 to 15 percent slopes, eroded	50	100	85	80	34	4
MaE2	Malibu loam, 15 to 30 percent slopes, eroded	50	100	75	75	28	4
MaF	Malibu loam, 30 to 50 percent slopes	50	100	40	75	15	5
McA	Metz loamy fine sand, 0 to 2 percent slopes	85	85	100	100	72	2
McC	Metz loamy fine sand, 2 to 9 percent slopes	85	85	90	100	65	2
MeA	Metz loamy sand, 0 to 2 percent slopes	85	75	100	100	64	2
MeC	Metz loamy sand, 2 to 9 percent slopes	85	75	90	100	57	3
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes	85	75	100	100	64	2
MhF	Millsholm loam, 15 to 50 percent slopes	35	90	60	80	15	5
MkG	Millsholm very rocky loam, 30 to 75 percent slopes	35	60	30	70	4	6
MmF2	Millsholm-Malibu complex, 30 to 50 percent slopes, eroded:						
	Millsholm	40	80	40	65	8	6
	Malibu	50	100	40	75	15	5
MoA	Mocho loam, 0 to 2 percent slopes	100	100	100	100	100	1
MoC	Mocho loam, 2 to 9 percent slopes	100	100	90	100	90	1
MrC	Mocho gravelly loam, 2 to 9 percent slopes	100	75	90	100	68	2
MsA	Mocho clay loam, 0 to 2 percent slopes	100	85	100	100	85	1
MsB	Mocho clay loam, 2 to 5 percent slopes	100	85	95	100	81	1
NaD2	Nacimiento silty clay loam, 9 to 15 percent slopes, eroded	70	90	85	80	43	3
NaE2	Nacimiento silty clay loam, 15 to 30 percent slopes, eroded	70	90	75	85	40	3
NaF	Nacimiento silty clay loam, 30 to 50 percent slopes	70	90	40	75	19	5
NaG	Nacimiento silty clay loam, 50 to 75 percent slopes	70	90	20	65	8	6
OhA	Ojai very fine sandy loam, 0 to 2 percent slopes	75	100	100	100	75	2

TABLE 6.--STORIE INDEX RATING FOR SOILS OF THE VENTURA AREA--Continued

Map symbol	Soil	Storie index					
		Rating factors				Index rating	Soil grade
		A (Profile)	B (Texture)	C (Slope)	X (Other conditions)		
OhC2	Ojai very fine sandy loam, 2 to 9 percent slopes, eroded	75	100	90	85	57	3
OhD2	Ojai very fine sandy loam, 9 to 15 percent slopes, eroded	75	100	85	80	51	3
OsD2	Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded	75	70	85	80	36	4
OsE2	Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded	75	70	75	75	30	4
Pa	Pacheco silty clay loam	95	90	100	70	60	2
PcA	Pico sandy loam, 0 to 2 percent slopes	90	95	100	100	86	1
PcC	Pico sandy loam, 2 to 9 percent slopes	90	95	90	100	77	2
PsA	Pico loam, sandy substratum, 0 to 2 percent slopes	80	95	100	100	76	2
PxG	Pits and dumps	---	---	---	---	<5	6
RcC	Rincon silty clay loam, 2 to 9 percent slopes	70	90	100	85	54	3
RcD2	Rincon silty clay loam, 9 to 15 percent slopes, eroded	70	90	85	80	43	3
RcE2	Rincon silty clay loam, 15 to 30 percent slopes, eroded	70	90	75	75	35	4
RcE3	Rincon silty clay loam, 9 to 30 percent slopes, severely eroded	70	90	80	70	35	4
Rw	Riverwash	---	---	---	---	<5	6
SaA	Salinas clay loam, 0 to 2 percent slopes	95	85	100	100	81	1
SaC	Salinas clay loam, 2 to 9 percent slopes	95	85	90	100	73	2
SbF	San Andreas sandy loam, 30 to 50 percent slopes	60	95	40	75	17	5
ScD2	San Benito clay loam, 9 to 15 percent slopes, eroded	80	85	85	80	46	3
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded	80	85	75	75	38	4
ScF2	San Benito clay loam, 30 to 50 percent slopes, eroded	80	85	40	65	18	5
ScG	San Benito clay loam, 50 to 75 percent slopes	80	85	20	60	8	6
Sd	Sandy alluvial land	---	---	---	---	10	5
SeE	Santa Lucia shaly silty clay loam, 15 to 30 percent slopes	60	75	75	80	27	4
SeF	Santa Lucia shaly silty clay loam, 30 to 50 percent slopes	60	75	40	75	14	5
SeG	Santa Lucia shaly silty clay loam, 50 to 75 percent slopes	60	75	20	60	5	6
ShE	Saugus sandy loam, 5 to 30 percent slopes	75	95	75	85	45	3
ShF2	Saugus sandy loam, 30 to 50 percent slopes, eroded	75	95	40	65	18	5
SnG	Sedimentary rock land	---	---	---	---	<10	6
SoE2	Sespe clay loam, 15 to 30 percent slopes, eroded	65	85	75	75	31	4
SoF	Sespe clay loam, 30 to 50 percent slopes	65	85	40	75	17	5

TABLE 6.--STORIE INDEX RATING FOR SOILS OF THE VENTURA AREA--Continued

Map symbol	Soil	Storie index					
		Rating factors				Index rating	Soil grade
		A (Profile)	B (Texture)	C (Slope)	X (Other conditions)		
SoG	Sespe clay loam, 50 to 75 percent slopes	65	85	20	75	8	6
SsE2	Soper loam, 15 to 30 percent slopes, eroded	65	100	75	75	36	4
SvF2	Soper gravelly loam, 30 to 50 percent slopes, eroded	65	75	40	65	13	5
SwA	Sorrento loam, 0 to 2 percent slopes	100	100	100	100	100	1
SwC	Sorrento loam, 2 to 9 percent slopes	100	100	90	100	90	1
SxA	Sorrento silty clay loam, 0 to 2 percent slopes	100	90	100	100	90	1
SxC	Sorrento silty clay loam, 2 to 9 percent slopes	100	90	90	100	81	1
SzC	Sorrento clay loam, heavy variant, 2 to 9 percent slopes	100	85	90	100	77	2
SzD	Sorrento clay loam, heavy variant, 9 to 15 percent slopes	100	85	85	95	69	2
TeF	Terrace escarpments	---	---	---	---	<10	6
Ts	Tidal flats	---	---	---	---	<10	6
VaA	Vina loam, 0 to 2 percent slopes	100	100	100	100	100	1
VaC	Vina loam, 2 to 9 percent slopes	100	100	90	100	90	1
VnC	Vina gravelly loam, 2 to 9 percent slopes	100	75	90	100	68	2
VsC	Vina silty clay loam, 2 to 9 percent slopes	100	90	90	100	81	1
ZmC	Zamora loam, 2 to 9 percent slopes	95	100	90	100	86	1
ZmD2	Zamora loam, 9 to 15 percent slopes, eroded	95	100	85	80	65	2

This section describes the major factors of soil formation, tells how these factors have affected the soils of the Ventura Area, and explains some of the principal processes in horizon development. It also defines the current system for classifying soils and shows the classification of the soils by series and higher categories.

Factors of Soil Formation

Soil forms through the interaction of the major soil-forming factors--parent material, climate, vegetation and animal life, relief, and time.

Climate and vegetation are the active forces in soil formation. Relief modifies the effects of climate and vegetation, mainly through its influence on runoff and temperature. Parent material also affects the kind of profile that forms. Time is needed for changing the parent material into soil. Usually a long time is required for the formation of distinct horizons.

Parent Material

Parent material, which is the weathered rock or unconsolidated mass from which the soil forms, determines the chemical and mineralogical composition of the soil. Soils of the Ventura Area formed in material weathered from sandstone, shale, and basic igneous rock, and in alluvium derived from mixed rock sources.

Marine sandstone, shale, and semiconsolidated material occupy the major part of the uplands. Considerable interbedding occurs, and the material varies in hardness and lime content. In sandstone and shale the percentage of the slowly weatherable mineral quartz is relatively high. These rocks differ mainly in the size of the individual grains and the strength of the cementing agents. Sandstone is the coarser grained. Sandy soils, such as Arnold and Gaviota soils, formed in material weathered from sandstone. Loamy, silty, and clayey soils, for example, Balcom, Castaic, Diablo, Nacimiento, and San Benito soils, formed in material weathered from shale.

Basic igneous rocks occur in the southern part of the Ventura Area, mainly in an area that extends from Long Grade Canyon and Conejo Mountain through the south side of Santa Rosa Valley. They also occur south of Newbury Park and in an area that extends from Sandstone Peak to the Ventura County-Los Angeles County line. In basic igneous rocks the percentage of weatherable minerals is high. Clayey soils, such as Gilroy and Hambright soils, formed in material weathered from these rocks.

Except for Vina soils, which formed in alluvium derived from basic igneous rocks, the alluvial soils in the Area are derived from mixed rock sources. Some are relatively uniform in texture; some are stratified. The texture ranges from sand to clay, and the reaction from slightly acid to moderately alkaline.

Climate

The climate of the Area is characterized by mild winters, warm summers, and moderate rainfall. Presumably it is similar to the climate under which the soils formed. Only the stony and cobbly soils in the Ojai and Santa Clara Valleys appear to have formed under a climate in which storms were of higher intensity. About 14 to 22 inches of rain falls annually. This amount is insufficient to leach bases from the soil profiles. Consequently, some soils, for example, Anacapa, Cropley, Pacheco, Salinas, and Sorrento soils, have a zone of carbonate accumulation.

Living Organisms

Vegetation, burrowing animals, insects, earthworms, bacteria, and fungi are important in the formation of soils. Plants generally have a greater influence on soil formation than other living organisms have. They provide shade and cover, thus reducing runoff and the erosion hazard, and their roots loosen the soil material and add organic matter, thereby influencing soil structure and physical condition. Bases move upward from plant roots to the leaves and stems and are eventually returned to the soil, unless they are removed by grazing animals. This process counteracts the leaching of bases by rainfall and adds organic matter to the soil. Scanty vegetation contributes no appreciable amount of organic matter. Hence, soils that developed under brush, Arnold and Gaviota soils, for example, are affected by droughtiness, are low in organic-matter content, and have a light-colored surface layer. In contrast, soils that developed under grasses and forbs, Diablo, Linne, and Nacimiento soils, for example, are fine textured, are high in organic-matter content, and have a dark-colored surface layer. Well-drained alluvial soils, such as Anacapa, Garretson, Mocho, and Sorrento soils, developed under annual grasses and scattered brush. Poorly drained soils, for example, Camarillo, Hueneme, and Pacheco soils, developed under salt tolerant and water-tolerant plants.

Micro-organisms play an important part in transforming plant nutrients. Burrowing animals and earthworms loosen and mix the soil and thus slow down the formation of distinct soil horizons.

Relief

Relief, or the shape of the landscape, influences soil formation, mainly through its effect on drainage and erosion, and partly through variations in exposure to the sun and wind and in air drainage.

Camarillo, Hueneme, and Pacheco soils formed in low-lying, poorly drained areas under salt-tolerant and water-tolerant plants. They have mottled underlying horizons that contain segregated lime and gypsum. Anacapa, Garretson, and Pico soils formed on

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well-drained alluvial fans and plains. They lack mottles and segregated gypsum. Upland soils on north-facing slopes receive less direct sunlight, have cooler soil temperatures and retain moisture longer than those on south-facing slopes, and they therefore tend to develop a denser vegetative cover, and in turn, a deeper, darker colored surface layer. For example, San Benito soils, which generally occur on north-facing slopes, have a deeper surface layer than Nacimiento soils, which commonly occur on adjacent south-facing slopes. On steep slopes, relief is the dominant factor in soil formation. In these areas the soil material is removed by erosion nearly as fast as it forms; consequently, a thick soil profile seldom develops. Examples of shallow, steep soils are the Calleguas, Gaviota, and Millsholm soils.

Time

A long time is generally required for soil formation. The length of time depends largely on the other four soil-forming factors. Presumably, under a good vegetative cover and the most favorable climate, the formation of a single inch of topsoil from the raw material of the subsoil takes from 200 to 1,000 years. The formation of Huerhuero and Rincon soils, for example, which have a strongly developed subsoil, or Chesterton soils, which have a silica-cemented hardpan, indicates a million or more years of soil-building processes. Soils that have been in place for a relatively short time have not yet been influenced enough by the other soil-forming factors to have developed well-defined and genetically related horizons. Examples are Anacapa, Garretson, and Pico soils, which formed in recent alluvium. Time is directly related to relief for young soils in areas where soil material is removed by erosion nearly as fast as it forms. Young soils on steep slopes, such as Arnold, Balcom, Castaic, Gaviota, Nacimiento, and Saugus soils, lack well-developed horizons.

Processes of Soil Formation

The accumulation of organic matter, the solution, transfer, and reprecipitation of calcium carbonate and bases, the liberation, reduction, and transfer of iron, and the formation and translocation of silicate clay minerals have been active processes in the formation of the soils of the Ventura Area.

Accumulation of organic matter in the surface layer of the soils has been an important process in the formation of an A1 horizon. In general, the soils that formed under dense vegetation and have the thickest, darkest colored A1 horizon are highest in organic-matter content.

Leaching of carbonates from the upper horizons has occurred in a few soils in the Area. Generally this process precedes translocation of silicate clay minerals. The Huerhuero soil is an example of a soil that has been leached of carbonates to a depth below the accumulated silicate clay minerals.

Silicate clay accumulates in pores and forms bridges across sand grains and films on surfaces along which water moves. In the soils of this Area, the leaching of bases and the translocation of silicate clays are among the more important processes of horizon differentiation. The Hambright soil is an example of a soil that has a minimum of translocated clay. In contrast, the Huerhuero soil is an example of a soil that has maximum clay translocation.

The reduction of iron, a process called gleying, results in mottled or olive and gray colors. Gleying is associated with poorly drained soils, such as Camarillo and Pacheco soils.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (2) and revised later (9). The system currently used by the National Cooperative Soil Survey was adopted in 1965 (11). It is under continual study. Readers interested in the development and application of the system should refer to the latest literature available (6, 7).

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 7 shows the classification of each soil series of the Ventura Area by family, subgroup, and order, according to the current system.

A detailed description of each soil series represented in the Ventura Area is given in the section "Descriptions of the Soils."

TABLE 7.--SOIL SERIES CLASSIFIED ACCORDING TO THE CURRENT SYSTEM OF CLASSIFICATION

Series	Family	Subgroup	Order
Anacapa	Coarse-loamy, mixed, thermic	Calcic Pachic Haploxerolls	Mollisols.
Arnold	Mixed, thermic	Typic Xeropsamments	Entisols.
Azule	Fine, montmorillonitic, thermic	Mollic Haploxeralfs	Alfisols.
Balcom	Fine-silty, mixed, calcareous, thermic	Typic Xerorthents	Entisols.
Calleguas	Loamy-skeletal, mixed, calcareous, thermic	Lithic Xerorthents	Entisols.
Camarillo	Fine-loamy, mixed, calcareous, thermic	Aquic Xerofluvents	Entisols.
Castaic	Fine-silty, mixed, nonacid, thermic	Typic Xerorthents	Entisols.
Chesterton 1/	Fine, montmorillonitic, thermic	Abruptic Durixeralfs	Alfisols.
Cibo	Fine, montmorillonitic, thermic	Typic Chromoxererts	Vertisols.
Corralitos	Mixed, thermic	Typic Xeropsamments	Entisols.
Cortina	Loamy-skeletal, mixed, nonacid, thermic	Typic Xerofluvents	Entisols.
Cropley	Fine, montmorillonitic, thermic	Chromic Pelloxererts	Vertisols.
Cropley, calcareous variant.	Fine, montmorillonitic, thermic	Chromic Pelloxererts	Vertisols.
Diablo	Fine, montmorillonitic, thermic	Chromic Pelloxererts	Vertisols.
Garretson	Fine-loamy, mixed, nonacid, thermic	Typic Xerorthents	Entisols.
Garretson, calcareous variant.	Fine-silty, mixed, calcareous, thermic	Typic Xerorthents	Entisols.
Gaviota	Loamy, mixed, nonacid, thermic	Lithic Xerorthents	Entisols.
Gazos 1/	Fine-loamy, mixed, thermic	Typic Haploxerolls	Mollisols.
Gilroy	Fine-loamy, mixed, thermic	Typic Argixerolls	Mollisols.
Hambright	Loamy-skeletal, mixed, thermic	Lithic Haploxerolls	Mollisols.
Hueneme	Coarse-loamy, mixed, calcareous, thermic	Aquic Xerofluvents	Entisols.
Huerhuero	Fine, montmorillonitic, thermic	Haplic Natrixeralfs	Alfisols.
Kimball	Fine, montmorillonitic, thermic	Mollic Palexeralfs	Alfisols.
Linne	Fine-loamy, mixed, thermic	Calcic Pachic Haploxerolls	Mollisols.
Lodo	Loamy, mixed, thermic	Lithic Haploxerolls	Mollisols.
Los Osos	Fine, montmorillonitic, thermic	Typic Argixerolls	Mollisols.
Malibu	Fine, montmorillonitic, thermic	Abruptic Palexerolls	Mollisols.
Metz	Sandy, mixed, thermic	Typic Xerorthents	Entisols.
Millsholm	Loamy, mixed, thermic	Lithic Xerochrepts	Inceptisols.
Mocho	Fine-loamy, mixed, thermic	Calcic Entic Haploxerolls	Mollisols.
Nacimiento	Fine-loamy, mixed, thermic	Calcic Entic Haploxerolls	Mollisols.
Ojai	Fine-loamy, mixed, thermic	Mollic Haploxeralfs	Alfisols.
Pacheco	Fine-loamy, mixed, thermic	Aquic Haploxerolls	Mollisols.
Pico	Coarse-loamy, mixed, thermic	Calcic Entic Haploxerolls	Mollisols.
Rincon	Fine, montmorillonitic, thermic	Mollic Haploxeralfs	Alfisols.
Salinas	Fine-loamy, mixed, thermic	Calcic Pachic Haploxerolls	Mollisols.
San Andreas	Coarse-loamy, mixed, thermic	Typic Haploxerolls	Mollisols.
San Benito	Fine-loamy, mixed, thermic	Calcic Pachic Haploxerolls	Mollisols.
Santa Lucia	Clayey-skeletal, mixed, thermic	Pachic Ultic Haploxerolls	Mollisols.
Saugus	Coarse-loamy, mixed, nonacid, thermic	Typic Xerorthents	Entisols.
Sespe	Fine, montmorillonitic, thermic	Typic Argixerolls	Mollisols.
Soper 1/	Loamy-skeletal, mixed, thermic	Typic Argixerolls	Mollisols.
Sorrento	Fine-loamy, mixed, thermic	Calcic Haploxerolls	Mollisols.
Sorrento, heavy variant.	Fine, montmorillonitic, thermic	Entic Haploxerolls	Mollisols.
Vina	Fine-loamy, mixed, thermic	Fluventic Haploxerolls	Mollisols.
Zamora	Fine-silty, mixed, thermic	Mollic Haploxeralfs	Alfisols.

1/ Not typical of series. See first mapping unit under series.

This section provides information about the general physiography of the Ventura Area, about the climate, and about the water supply and the means of supplying and distributing water in the Area. The Area has a varied physiography made up of a coastal plain, low mountains, and intermountain valleys. The climate, though on the whole mild and dry, varies because of the variations in physiography. Because the total amount of precipitation is small, conserving water and obtaining water from additional sources outside the Area are vital concerns.

Physiography

Part of the Ventura Area is on the Coastal Plain, and part is on the coastal mountains and in the intermountain valleys of the Transverse Range.

The Coastal Plain.--About 85,000 acres of the survey Area, extending for 18 miles along the ocean and for about 9 miles inland, is on the Coastal Plain (4). The plain was formed by the deposition of sediments from the Santa Clara River and from the streams of the Calleguas-Conejo drainage system. It has a mean elevation of 50 feet, but at points south of the Santa Clara River, the elevation is as much as 150 feet, and at points north of the river, as much as 300 feet.

The part of the plain that extends south from the Santa Clara River to near Revolon Slough and centers on the city of Oxnard is known as the Oxnard Plain. The part that centers on the community of Camarillo is called Pleasant Valley; it is part of the Calleguas-Conejo drainage sytem.

Most of the arable land in the survey Area is on the Coastal Plain.

The coastal mountains.--Mountains rim the Area on its landward side. They range in elevation from about 50 feet, along the coast south of the Coastal Plain, to about 3,100 feet, in the Santa Monica Mountains. The Santa Ynex Mountains, the Topatopa Mountains, and the Piru Mountains form the northern boundary, the Santa Susana Mountains the eastern boundary, and the Simi Hills and the Santa Monica Mountains the southern boundary. South Mountain and Oak Ridge are long, low, east-west mountains that separate Santa Clara Valley from Las Posas Valley and Simi Valley. The Camarillo Hills and the Las Posas Hills extend from Camillo to Simi and separate the Las Posas-Simi area from Santa Rosa Valley and Tierra Rejada Valley.

The intermountain valleys.--The valley of the Santa Clara River, the most prominent valley in the Area, trends east-southwest. The Santa Clara River drains an area of 1,605 square miles (5). It flows generally in a southwesterly direction from its headwaters in Los Angeles County to where it empties into the Pacific Ocean. Its principal tributaries are Sespe Creek, Piru Creek, and Santa Paula Creek. The mean seasonal natural runoff of the Santa Clara River at its mouth is estimated to be about 216,400 acre-feet (5).

The valley of the Ventura River is a rather narrow, north-south trending valley north of Ventura. Ojai Valley is connected to the Ventura River valley by San Antonio Creek. The small Upper Ojai Valley, east of Ojai Valley and 300 to 500 feet higher, drains to the Ventura River on the west and to Santa Paula Creek on the east. Ojai and Upper Ojai Valleys are surrounded by mountains and are rich farming areas. The Ventura River flows generally south and drains an area of 226 square miles (5). The mean seasonal natural runoff of the river where it empties into the Pacific Ocean is estimated to be about 67,800 acre-feet (5).

Over South Mountain and Oak Ridge, south of the Santa Clara River, are Las Posas Valley and Simi Valley. Las Posas Valley extends eastward from the Coastal Plain almost to Simi Valley, which is in the east end of the Area. Simi Valley is bounded on the east by the Santa Susana Mountains and on the south by the Simi Hills. Old terraces occur around the perimeter of the Simi Valley. To the south, over the Camarillo Hills and the Las Posas Hills, are Santa Rosa and Tierra Rejada Valleys, which extend from Camarillo eastward for about 10 miles. In the hills south of Santa Rosa Valley is the high, broad Conejo Valley. Simi Valley, Santa Rosa Valley, Tierra Rejada Valley, and Conejo Valley are drained by Calleguas Creek and its principal tributary, Conejo Creek. These creeks originate in the Santa Susana and Santa Monica Mountains. They flow generally in a southwesterly direction and discharge into the Pacific Ocean through Mugu Lagoon. The drainage area is about 330 square miles in extent (5). The mean seasonal natural runoff is estimated to be about 15,200 acre-feet (5).

Climate [5/]

Climatic data for the whole of Ventura County are discussed in the text of this section, although only the southern half of the county was covered by this soil survey (see figure 1, page 1). Figure 2, Average length of growing season, and figure 3, Average seasonal precipitation, show only the part of the county that was surveyed.

Ventura County has a considerable range in climate because of differences in topography between one part of the county and another. In the survey Area, temperatures are moderate and the growing season is long, but rainfall is limited in summer and crops have to be irrigated.

The average annual temperature is near 60° at low elevations near the coast, in the 50's over most of the northern two-thirds of the county, and less than 45° in the Topatopa Mountains. The annual range in temperature is between 70° and 80° on the Coastal

5/ By C. Robert Elford, State climatologist, U.S. Weather Bureau.

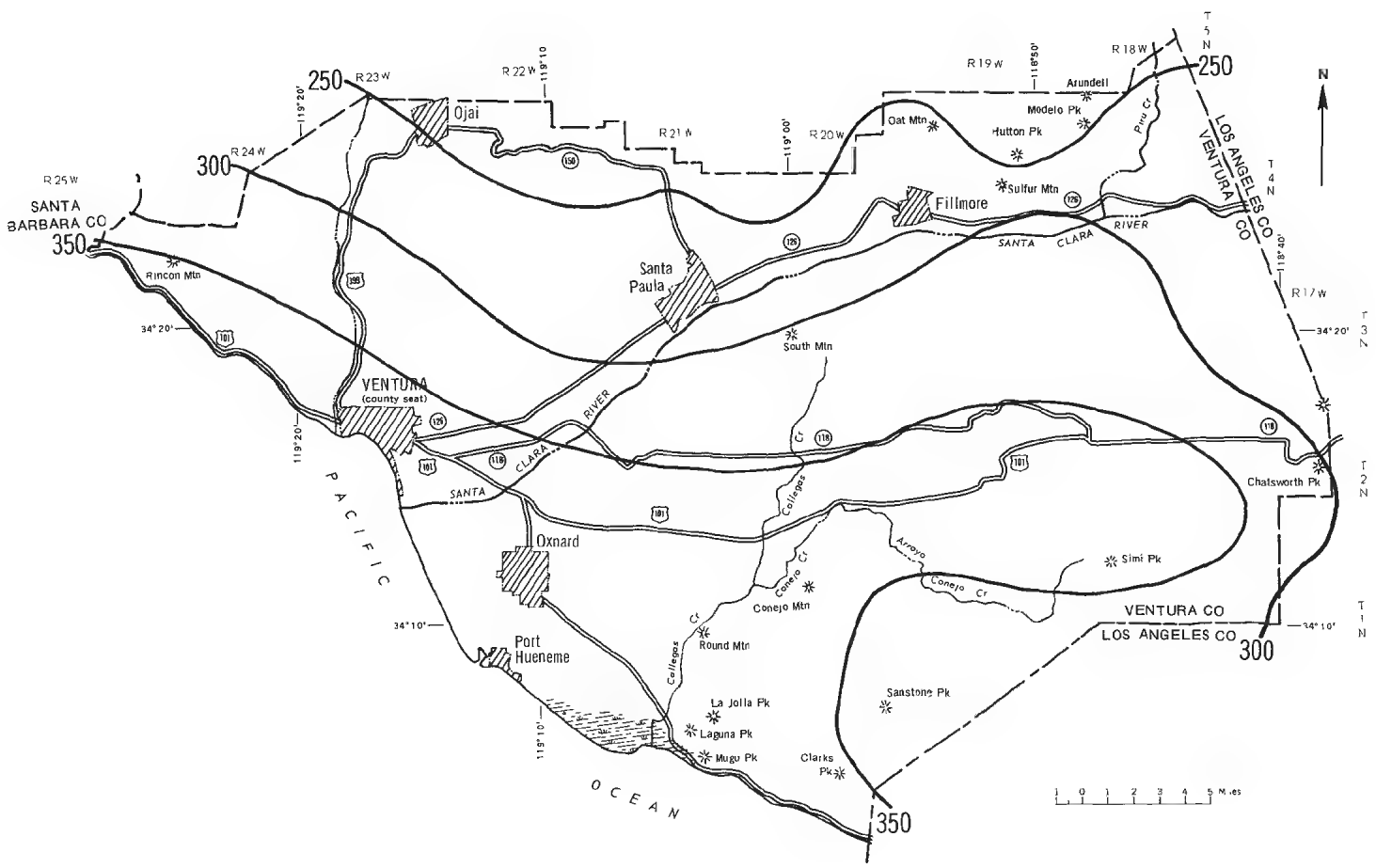

Figure 2.--Average length of growing season, in days, in Ventura Area.

Plain and as much as 100° in the interior. For July, the average maximum temperature is between 70° and 80° on the Coastal Plain but exceeds 90° in the upper part of the Ventura and Cuyama River valleys. For January, the average minimum temperature is near 40° on the coast but in the lower 30's and upper 20's in the northern part of the county.

No temperature data are available for the highest parts of the county.

The average date of the last freeze (32° temperature) in spring is in January near the coast and progressively later farther inland. In the northern half of the county, the average date is in May. In some locations near the coast, a freeze in fall is unusual. A little farther inland a freeze occurs, on the average in the latter part of December, and in the upper part of the Cuyama River valley, early in October. The length of the growing season ranges from more than 300 days near the coast (fig. 2) to less than 175 days in the coldest part of the county.

In both the northern and the southern ends of the county, the annual precipitation totals between 10 and 15 inches (fig. 3). In the Topatopa Mountains, the annual total is more than 33 inches. The drier parts get less than 5 inches of rain in 1 year out of 20, and the higher, wetter parts get more than 60 inches in 1 year out of 20. Measurable amounts of rainfall are reported on 30 to 35 days a year, and half an inch or more on 6 to 12 days a year.

Over the northern half of the county, snowfall averages 5 inches or more a year, and along the northern border near Mt. Pinos, more than 20 inches.

For the entire year, potential evapotranspiration ranges from about 30 inches near the coast to 28 inches in the interior; for the growing season, it ranges from about 29 inches near the coast to about 20 inches in the interior. Estimated actual evapotranspiration for the year ranges from 12 inches in the southern part of the county to 7 inches in the northwestern corner; for the growing season, it ranges from 10 to 12 inches near the coast to only 3 to 5 inches near the Cuyama River. These figures suggest that range grasses are likely to dry out about June 1 near the coast, as early as May 20 in the northwest corner of the county, and as late as June 10 in the mountains.

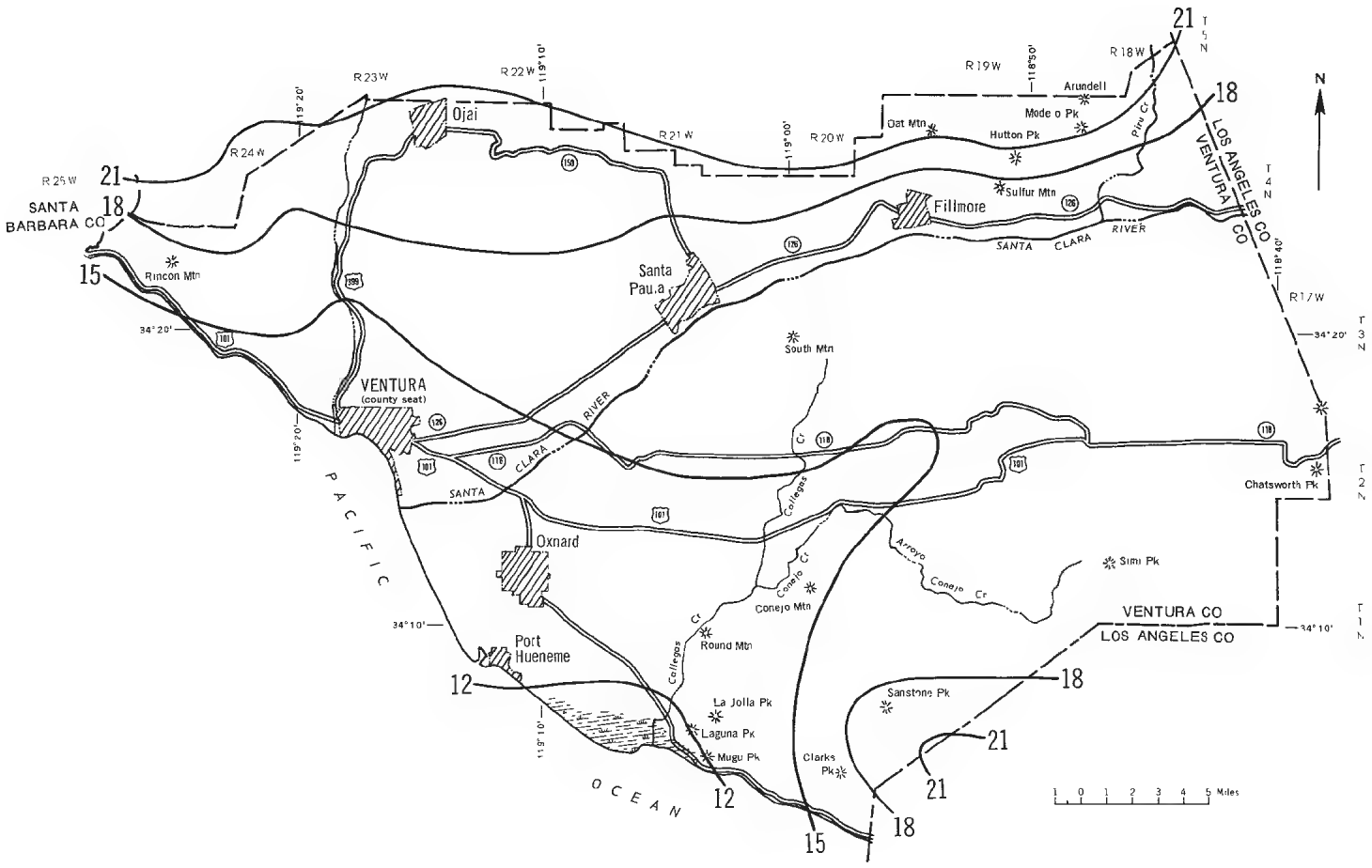

Figure 3.--Average seasonal precipitation, in inches, in Ventura Area.

Water Supply

Direct precipitation and runoff from tributary drainage areas are the principal sources of water in the survey Area. Small amounts of water are imported. Irrigation and urban needs are met mainly by pumping water from wells that draw from ground water storage basins. Since the 1930's, consumption of water has exceeded replacement. Water conservation programs were initiated in the late 1940's (3).

Water service is provided by individuals, by municipal and other public agencies, by many private agencies, and by public districts that deal with flood control and drainage problems as well as the problem of water supply.

Irrigation wells are generally owned by individuals, but there are mutual water companies that use a single well or a series of wells and distribute water on a share basis. Few individuals utilize surface water.

The three major water service agencies in Ventura County are the Calleguas Municipal Water District, the Ventura River Municipal Water District, and the United Water Conservation District.

The Calleguas Municipal Water District serves the southeastern part of the survey Area, which includes Simi Valley, the Thousand Oaks-Newbury Park area, and Camarillo. Well water and imported Colorado River water are used.

The Ventura River Municipal Water District serves the northwestern part of the surveyed Area, which includes the Ventura River Valley and Ojai Valley. The Robles Diversion Dam diverts water from the Ventura River through a canal into Casitas Reservoir, which has a capacity of 250,000 acre-feet. The district also maintains Matilija Reservoir, located northwest of Ojai on Matilija Creek, which has a storage capacity of 7,000 acre-feet.

The United Water Conservation District serves Santa Clara Valley and the Oxnard Plain. Water is supplied from both surface storage facilities and wells. Runoff from Piru Creek is stored in the district's Lake Piru, which has a storage capacity of 100,000 acre-feet. Water is released from the lake for percolation into underground basins or for use as a surface supply. Ground water is utilized extensively on the Oxnard Plain. Aquifers underlying this area are recharged by operations at the District's Piru, Saticoy, and El Rio spreading grounds.

LITERATURE CITED

(1) American Association of State Highway Officials.
1961. Standard Specifications for Highway Materials and Methods of Sampling and Testing. Ed. 8, 2 v., 401 and 617 pp., illus.

(2) Baldwin, Mark, Kellogg, Charles E., and Thorp, James.
1938. Soil Classification. U.S. Dept. Agr. Ybk., pp. 970-1001, illus.

(3) California Department of Water Resources.
1961. Ventura County and Upper Santa Clara River Drainage Area Land and Water Use Survey. Bul. No. 122, 59 pp., illus.

(4) _____
1965. Sea-Water Intrusion Oxnard Plain of Ventura County. Bul. No. 63-1, 59 pp., illus.

(5) California State Water Resources Board.
1953. Ventura County Investigation. Bul. No. 12, 2 v., 732 pp., illus. [Revised in 1956]

(6) Simonson, Roy W.
1962. Soil Classification in the United States. Soil Sci. 137: 1027 1034, illus.

(7) Smith, Guy D.
1965. Pedologie (Lectures on Soil Classification). Belgian Soil Sci. Soc., 134 pp.

(8) Storie, R. E.
1953. Revision of the Soil Rating Chart. Calif. Agr. Expt. Sta., 4 pp., illus.

(9) Thorp, James, and Smith Guy D.
1949. Higher Categories of Soil Classification: Order, Suborder, and Great Soil Groups. Soil Sci. 67: 117-126.

(10) United States Department of Agriculture.
1951. Soil Survey Manual. U.S. Dept. Agr. Handbook No. 18, 503 pp., illus.

(11) _____
1960. Soil Classification, a Comprehensive System, 7th Approximation. 265 pp., illus. [Supplement issued in March 1967 and amended through August 1968]

(12) Waterways Experiment Station, Corps of Engineers.
1953. The Unified Soil Classification System. Tech. Memo. 3-357, 2 v. and app. [Revised in 1957]

GLOSSARY

Acre-foot. The quantity of water, soil, or other material that will cover 1 acre to a depth of 1 foot.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage.

Alkaline soil. Any soil that has a pH greater than 7.0. See Reaction.

Alluvial fan. A fan-shaped deposit of sand, gravel, and fine material, sometimes called an apron, dropped by a stream where its gradient lessens abruptly.

Alluvial plain. A plain resulting from the deposition of alluvium by water.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water holding capacity. The capability of a soil to hold water in a form available to plants. Amount of moisture held in soil between field capacity, or about one-third bar of tension, and the wilting coefficient, or about 15 bars of tension.

Calcareous, soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held in capillary pores and as a film around soil particles by adhesion of surface tension.

Cemented. Indurated; having a hard, brittle consistency because the particles are held together by cementing substances such as humus, calcium carbonate, or the oxides of silicon, iron, and aluminum. The hardness and brittleness persist even when wet.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are--

Loose.--Noncoherent when dry or moist; does not hold together in a mass.

Friable.--When moist, crushes easily under gentle

pressure between thumb and forefinger and can be pressed together into a lump.

Firm.--When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.--When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.--When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.--When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.--When dry, breaks into powder or individual grains under very slight pressure.

Effective rooting depth. The depth to which a soil is readily penetrated by roots and utilized for extraction of water and plant nutrients. Depth classes are:

	Inches
Very deep	More than 60
Deep	40 to 60
Moderately deep	20 to 40
Shallow	10 to 20
Very shallow	Less than 10

Effervescence. The fizz observed when dilute hydrochloric acid is applied to a soil containing free carbonates. The amount of effervescence is divided into four classes--very slightly effervescent, slightly effervescent, strongly effervescent, violently effervescent.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents. Terms used to describe water erosion are--gully erosion (fairly deep, narrow channels cut by intermittent moving water), rill erosion (many small, nearly parallel channels cut by moving water), and sheet erosion (fairly uniform layer of soil material removed by moving water).

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has been allowed to drain away; the field moisture content 2 or 3 days after a soaking rain; also called normal field capacity, normal moisture capacity, or capillary capacity.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermitteht waterlogging.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material may be sandy or clayey, and it may be cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.--The layer of organic matter on the surface of mineral soil. This layer consists of decaying plant residues.

A horizon.--The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.--The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.--The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.--Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Igneous rock. Rock that has formed by the cooling and solidification of magma and that has not been changed appreciably since its formation.

Infiltration. A soil characteristic which determines the maximum rate at which water can enter the soil under specified conditions. Formerly designated infiltration capacity.

Inherent fertility. The capacity of the soil to supply nutrients to growing plants, without additions of fertilizers or soil amendments.

Intake rate. The rate at which water enters the soil.

Leaching. The removal of soluble materials from soils or other material by percolating water.

Leveling (of land). The reshaping, or modification, of the soil surface to a planned grade to permit uniform distribution of irrigation water and to provide good surface drainage.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance--few, common, and many; size--fine, medium, and coarse; and contrast--faint, distinct, and prominent. The size measurements are these: fine, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; medium, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and coarse, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables- hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Natural soil drainage. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Organic matter. A general term for plant and animal material, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition.

Pan. A layer in a soil that is firmly compacted or very rich in clay. Frequently the word "pan" is combined with other words that more explicitly indicate the nature of the layers; for example, hardpan or duripan, fragipan, claypan, and plowpan.

Parent material. The disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The rate at which water penetrates or passes through a soil mass or soil horizon. Terms used to describe permeability are:

	Inches per hour
Very slow	Less than 0.06
Slow	0.06 to 0.20
Moderately slow	0.02 to 0.63
Moderate	0.63 to 2.00
Moderately rapid	2.00 to 6.30
Rapid	6.30 to 20.00
Very rapid	More than 20.00

pH value. A numerical means for designating relatively weak acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value alkalinity; and a lower value, acidity.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Poorly graded. A soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles in poorly graded soil material, density can be increased only slightly by compaction.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or variations of a land surface, considered collectively.

Saline soil. A soil that contains soluble salts in amounts that impair growth of plants but that does not contain excess exchangeable sodium.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sedimentary rock. A rock formed from material deposited from suspension in water or precipitated from solution. The principal sedimentary rocks are sandstone, shale, limestone, and conglomerate.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slope class. The slope classes used in this survey are as follows:

		Descriptive terms	
Class	Percent	Simple slopes	Complex slopes
A	0 to 2	Nearly level or level	Nearly level or level
B	2 to 5	Gently sloping	Undulating
C	5 to 9	Moderately sloping	Gently rolling
D	9 to 15	Strongly sloping	Rolling
E	15 to 30	Moderately steep	Hilly
F	30 to 50	Steep	Steep
G	50 to 75	Very steep	Very steep
H	75+	Extremely steep	Extremely steep

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are--platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are (1) single grain (each grain by itself, as in dune sand) or (2) massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subgrade (engineering). The substratum, consisting of in-place material or fill material, that is prepared for highway construction; does not include stabilized base course or actual paving material.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Variant, soil. A soil having properties sufficiently different from other known soils to justify a new series name but making up such a limited geographic area that establishing a new series is not justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Well-graded soil. A soil or soil material consisting of particles that are well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which plants (specifically sunflower) wilt so much that they do not recover when placed in a dark, humid atmosphere.

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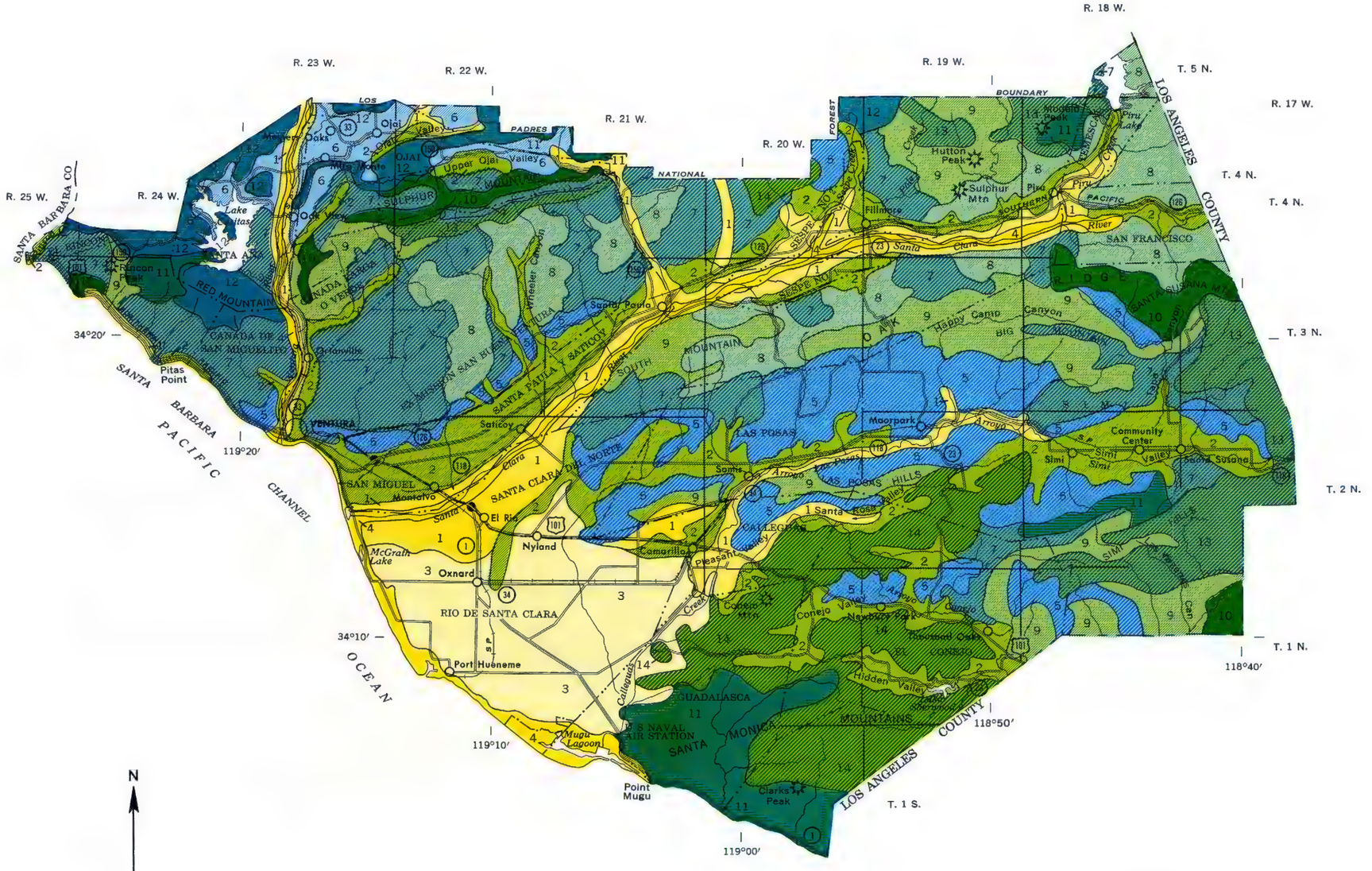


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

VENTURA AREA, CALIFORNIA

SOIL ASSOCIATIONS

LEVEL TO MODERATELY SLOPING, EXCESSIVELY DRAINED TO POORLY DRAINED SOILS OF THE ALLUVIAL FANS, PLAINS, AND BASINS.

1 — Pico-Metz-Anacapa association: Level to moderately sloping, very deep, well-drained sandy loams and very deep, somewhat excessively drained loamy sands.

2 — Mocho-Sorrento-Garretson association: Level to moderately sloping, very deep, well-drained loams to silty clay loams.

3 — Camarillo-Hueneme-Pacheco association: Level and nearly level, very deep, poorly drained loamy sands to silty clay loams.

4 — Riverwash-Sandy alluvial land-Coastal beaches association: Level to gently sloping, excessively drained to poorly drained, stratified sandy, gravelly, and cobbly material.

LEVEL TO MODERATELY STEEP, WELL DRAINED AND MODERATELY WELL DRAINED SOILS OF THE TERRACES.

5 — Rincon-Huerhuero-Azule association: Level to moderately steep, very deep, well drained and moderately well drained, very fine sandy loams to silty clay loams that have a slowly and very slowly permeable sandy clay subsoil.

6 — Ojai-Sorrento, heavy variant association: Level to moderately steep, very deep, well-drained very fine sandy loams and clay loams that have a slowly and moderately slowly permeable sandy clay loam and heavy clay loam subsoil.

MODERATELY SLOPING TO VERY STEEP, WELL-DRAINED AND EXCESSIVELY DRAINED SOILS OF THE UPLANDS.

7 — San Benito-Nacimiento-Linne association: Strongly sloping to very steep, well-drained clay loams and silty clay loams that are moderately deep to deep over shale or sandstone.

8 — Castaic-Balcom-Saugus association: Moderately sloping to very steep, well-drained sandy loams to silty clay loams that are moderately deep to deep over sandstone and shale.

9 — Calleguas-Arnold association: Strongly sloping to steep, well-drained shaly loams that are shallow over shale or sandstone, and somewhat excessively drained sands that are very deep over sandstone.

10 — Gazos-Santa Lucia association: Moderately steep to very steep, well-drained silty clay loams and shaly silty clay loams that are moderately deep to deep over fractured shale.

11 — Millsholm-Malibu-Los Osos association: Strongly sloping to very steep, well-drained loams and clay loams that have a clay loam and clay subsoil and are shallow to deep over sandstone and shale.

12 — Sespe-Lodo association: Moderately steep, to very steep, well-drained clay loams that are moderately deep to deep over sandstone or shale, and somewhat excessively drained loams that are shallow over shale.

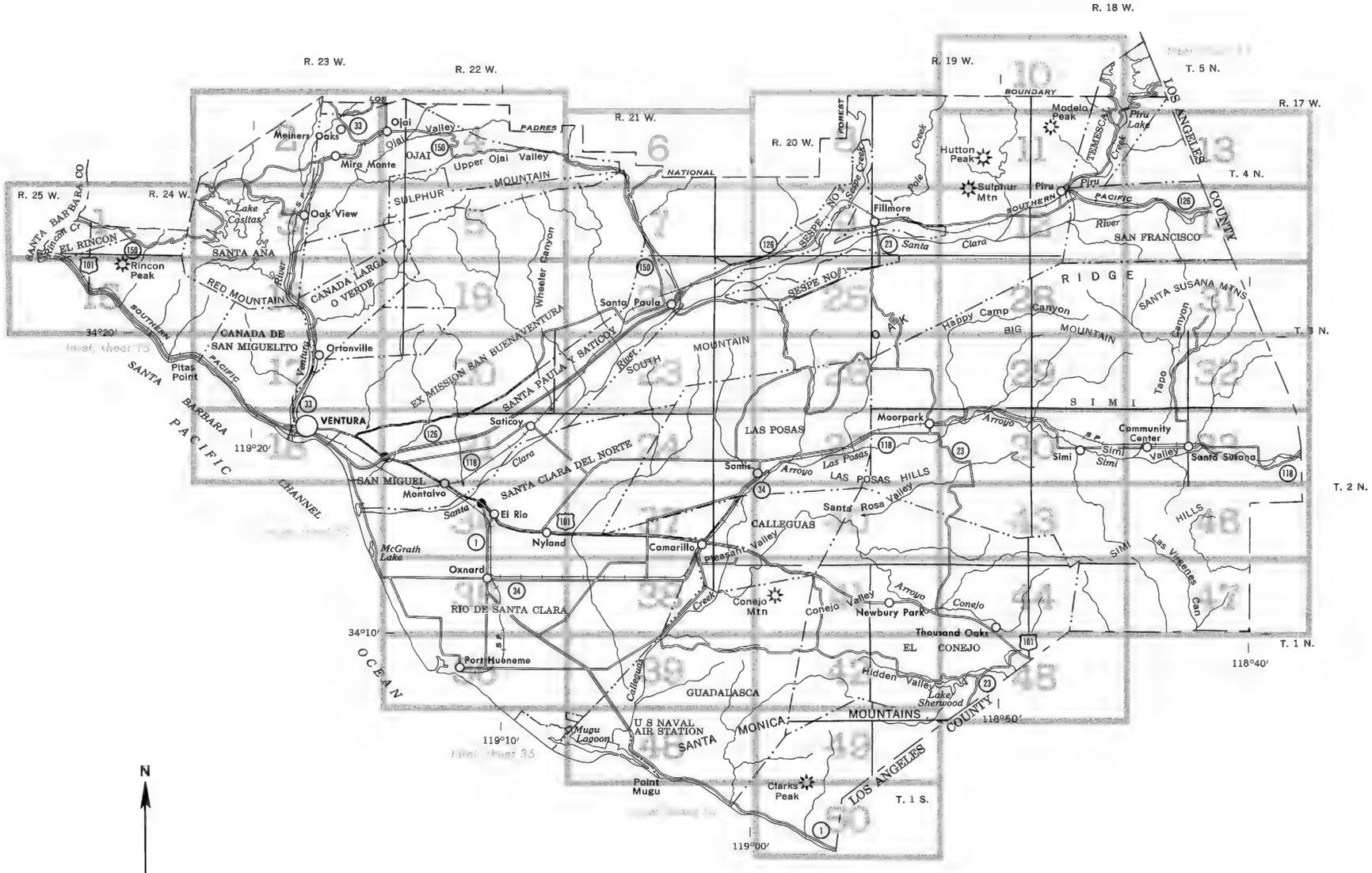
13 — Sedimentary rock land-Gaviota association: Moderately steep to very steep, excessively drained rock land and well-drained sandy loams that are shallow over sandstone.

14 — Hambright-Igneous rock land-Gilroy association: Rock land and strongly sloping to very steep, well-drained clay loams that are shallow to moderately deep over basic igneous rock.

November 1969

INDEX TO MAP SHEETS

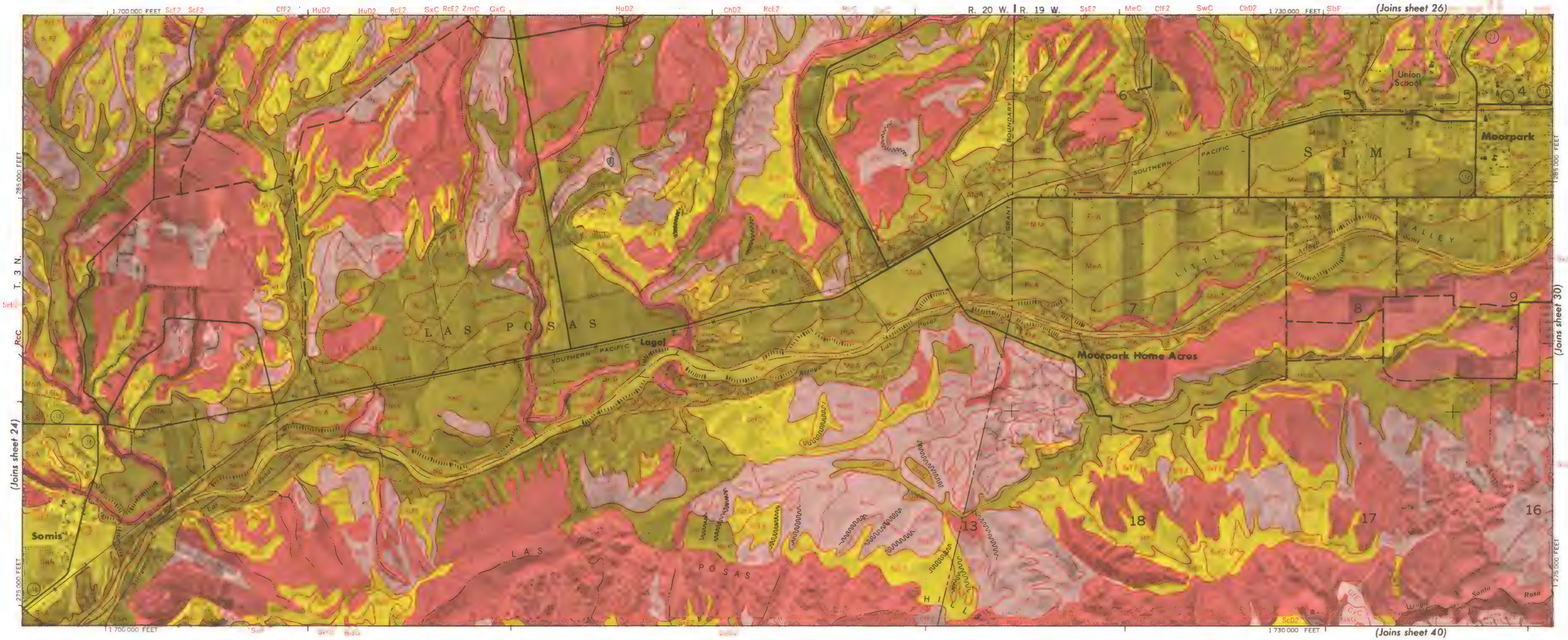
VENTURA AREA, CALIFORNIA



DETAILED, SOIL LIMITATIONS FOR AVOCADO ROOT ROT - VENTURA AREA, CALIFORNIA - SHEET 27

LEGEND

- Slight
- Moderate
- Severe
- Very Severe



Plane coordinate projection 1927 North American datum
5,000 foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs

Miles 1 ¾ ½ ¼ 0 1
5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

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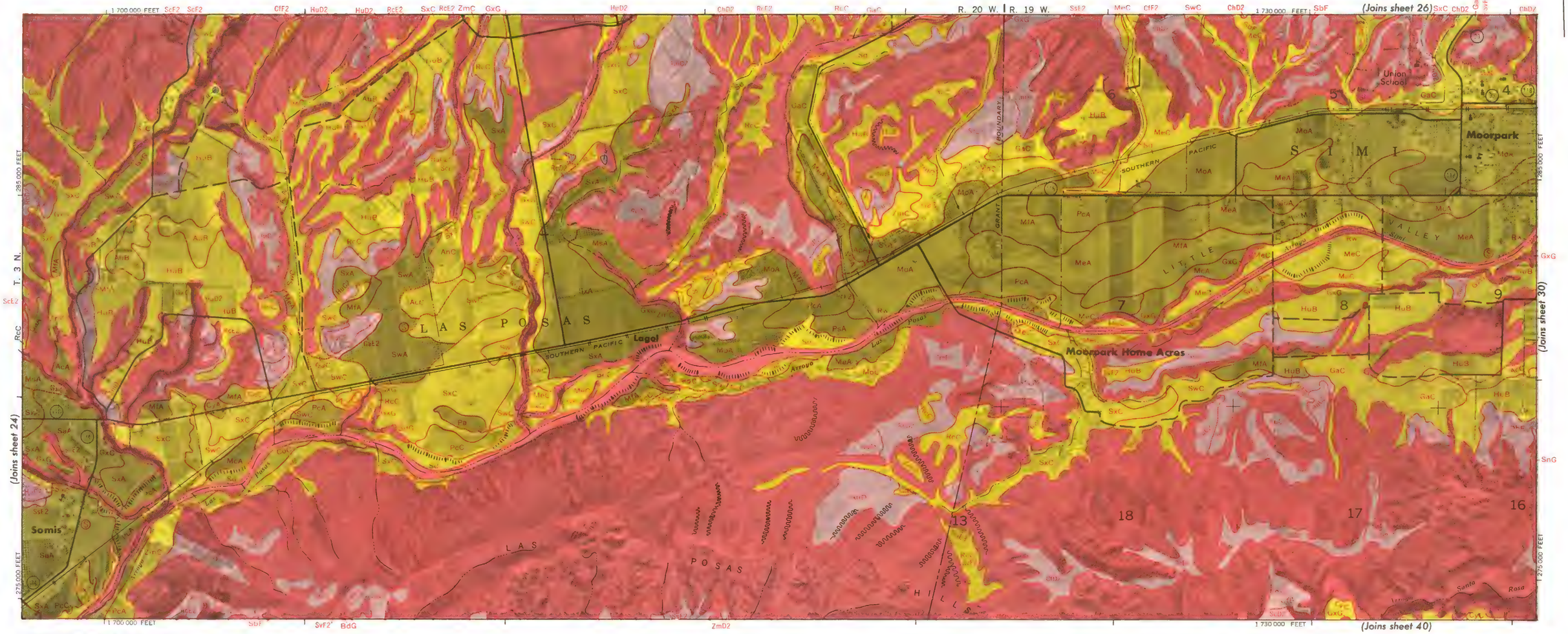
DETAILED, SOIL EROSION HAZARD - VENTURA AREA, CALIFORNIA - SHEET 27

LEGEND

- None to slight
- Moderate
- High
- Very high



Plane coordinate projection 1927 North American datum
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Zone 5. Mosaic compiled from 1959 and 1965 aerial phtographs.

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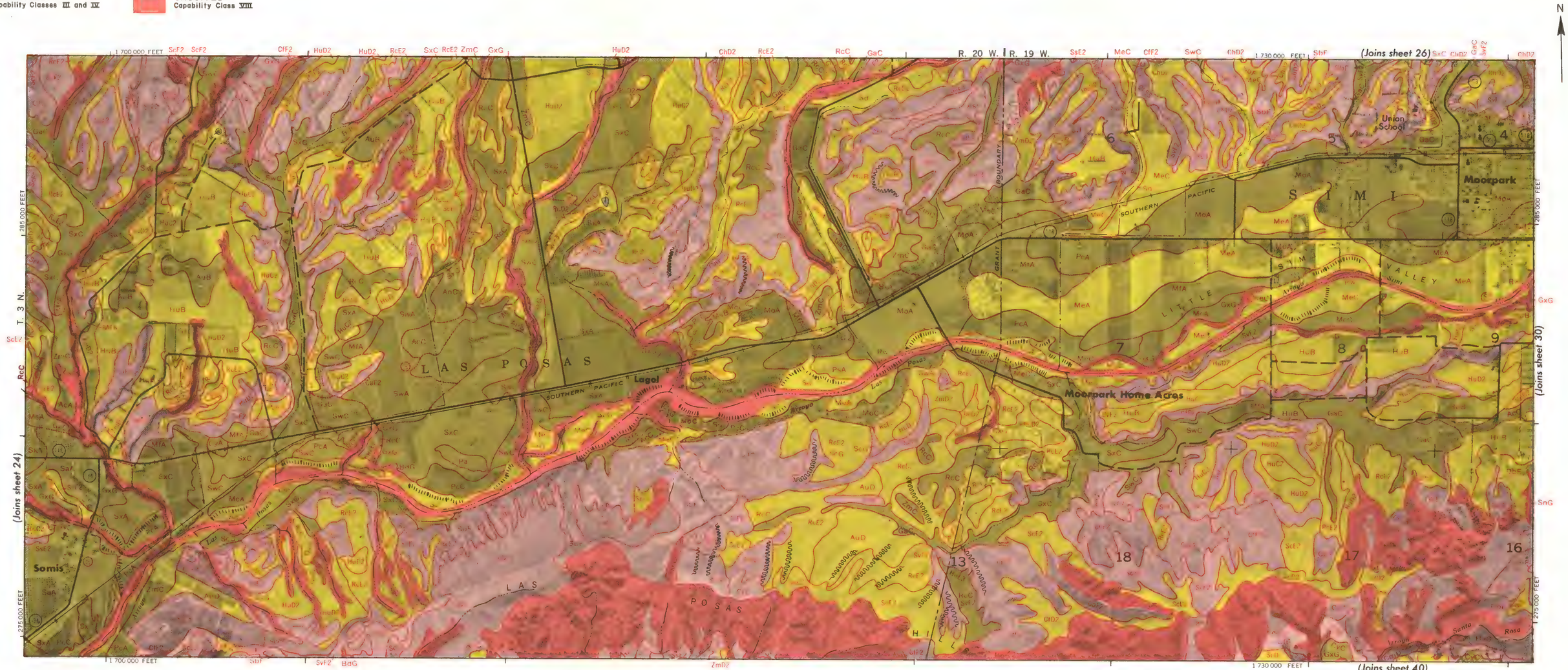
DETAILED, SUITABILITY FOR FARMING - VENTURA AREA, CALIFORNIA - SHEET 27

LEGEND

- VERY GOOD TO GOOD — Capability Classes I and II
- FAIR TO POOR — Capability Classes III and IV
- VERY POOR — Capability Classes VI and VII
- UNSUITED — Capability Class VIII



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs

Scale 1:24000

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GUIDE TO MAPPING UNITS

For complete information about a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. A technical description of a profile that is representative of the series is part of the description of the first mapping unit of each series. For complete information about a capability unit, read the introduction "Management by Capability Units," which gives general information about management. For information about hydrologic groups, see page 79. Other information is given in tables, as follows:

Acreage and extent, table 1, page 10.
Engineering uses of the soils, tables 2 and 3, pages 60 through 76.

Interpretations for farm and nonfarm uses, table 4, pages 80 through 103; table 5, pages 122 through 127; and table 6, pages 134 through 138.

Map symbol	Mapping unit	Described on page	Capability unit		Hydrologic group
			Symbol	Page	
AcA	Anacapa sandy loam, 0 to 2 percent slopes	9	IIs-4	111	B
AcC	Anacapa sandy loam, 2 to 9 percent slopes	9	IIe-1	109	B
AnC	Anacapa gravelly sandy loam, 2 to 9 percent slopes	13	IIe-1	109	B
AsF	Arnold sand, 9 to 50 percent slopes	13	VIIs-4	120	A
AuB	Azule loam, 0 to 5 percent slopes	14	IIe-3	109	C
AuC2	Azule loam, 2 to 9 percent slopes, eroded	14	IIIe-3	112	C
AuD	Azule loam, 9 to 15 percent slopes	14	IVe-3	113	C
AzC	Azule gravelly loam, 5 to 9 percent slopes	14	IIIe-3	112	C
BdG	Badland	15	VIIIe-1	121	D
CaE2	Calleguas shaly loam, 9 to 30 percent slopes, eroded	16	VIIe-1	118	D
CaF	Calleguas shaly loam, 30 to 50 percent slopes	15	VIIe-1	118	D
CbF2	Calleguas-Arnold complex, 30 to 50 percent slopes, eroded	16			
	Calleguas	--	VIIe-1	118	D
	Arnold	--	VIIs-4	120	A
Cc	Camarillo sandy loam	16	IIw-2	110	C
Cd	Camarillo loam	17	IIw-2	110	C
Ce	Camarillo loam, sandy substratum	17	IIw-2	110	C
CfD2	Castaic-Balcom complex, 9 to 15 percent slopes, eroded	17			
	Castaic	--	IIIe-1	111	C
	Balcom	--	IIIe-1	111	B
CfE	Castaic-Balcom complex, 15 to 30 percent slopes	18			
	Castaic	--	IVe-1	113	C
	Balcom	--	IVe-1	113	B
CfF2	Castaic-Balcom complex, 30 to 50 percent slopes, eroded	18			
	Castaic	--	VIe-1	115	C
	Balcom	--	VIe-1	115	B
CfG2	Castaic-Balcom complex, 50 to 65 percent slopes, eroded	19			
	Castaic	--	VIIe-1	118	C
	Balcom	--	VIIe-1	118	B
CgG2	Castaic and Saugus soils, 30 to 75 percent slopes, eroded	19			
	Castaic	--	VIIe-1	118	C
	Saugus	--	VIIe-1	118	B
ChD2	Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded	19	IVe-3	113	D
CkE3	Chesterton sandy loam, 9 to 30 percent slopes, severely eroded	20	VIe-3	116	D
CmD	Cibo clay, 5 to 15 percent slopes	21	IIIe-5	112	D
CmE	Cibo clay, 15 to 30 percent slopes	20	IVe-5	114	D
CnB	Coastal beaches	21	VIIIw-4	121	A
CoA	Corralitos loamy sand, 0 to 2 percent slopes	21	IIIs-4	113	A
CoC	Corralitos loamy sand, 2 to 9 percent slopes	21	IIIs-4	113	A
CrC	Cortina stony sandy loam, 2 to 9 percent slopes	22	IVs-7	115	A
CsD	Cortina very stony sandy loam, 9 to 15 percent slopes	22	VIs-7	118	A
CyA	Cropley clay, 0 to 2 percent slopes	22	IIs-5	111	D
CyC	Cropley clay, 2 to 9 percent slopes	23	IIe-5	110	D
Cz	Cropley clay, calcareous variant	23	IIw-5	110	D
DbD	Diablo clay, 9 to 15 percent slopes	25	IIIe-5	112	D
DbE	Diablo clay, 15 to 30 percent slopes	24	IVe-5	114	D

Map symbol	Mapping unit	Described on page	Capability unit		Hydrologic group
			Symbol	Page	
DbF	Diablo clay, 30 to 50 percent slopes	25	VIe-5	116	D
Fd	Fill land	25	IVw-4	114	B
GaA	Garretson loam, 0 to 2 percent slopes	26	I-1	109	B
GaC	Garretson loam, 2 to 9 percent slopes	25	IIe-1	109	B
GbC	Garretson gravelly loam, 2 to 9 percent slopes	26	IIe-1	109	B
GcB	Garretson silt loam, calcareous variant, 2 to 5 percent slopes	26	IIe-1	109	B
GrF	Gaviota rocky sandy loam, 15 to 50 percent slopes	27	VIIe-8	119	D
GsE	Gazos silty clay loam, 15 to 30 percent slopes	28	IVe-1	113	C
GsF	Gazos silty clay loam, 30 to 50 percent slopes	28	VIe-1	115	C
GsG	Gazos silty clay loam, 50 to 75 percent slopes	27	VIIe-1	118	C
GtD	Gilroy clay loam, 9 to 15 percent slopes	29	IVe-1	113	C
GtE	Gilroy clay loam, 15 to 30 percent slopes	29	IVe-1	113	C
GvF	Gilroy very rocky clay loam, 15 to 50 percent slopes	28	VIs-1	117	C
GxG	Gullied land	29	VIIIe-1	121	D
HaG	Hambright very rocky loam, 15 to 75 percent slopes	30	VIIs-8	120	D
HbF	Hambright rocky clay loam, 30 to 50 percent slopes	30	VIIe-8	119	D
Hm	Hueneme loamy sand, loamy substratum	31	IIw-2	110	C
Hn	Hueneme sandy loam	30	IIw-2	110	C
HuB	Huerhuero very fine sandy loam, 0 to 5 percent slopes	31	IIIe-3	112	D
HuC2	Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded	32	IVe-3	113	D
HuD2	Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded	32	IVe-3	113	D
HuE3	Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded	33	VIIe-3	119	D
IrG	Igneous rock land	33	VIIIs-1	121	D
KmC2	Kimball sandy loam, 2 to 9 percent slopes, eroded	33	IIIe-3	112	C
KmD2	Kimball sandy loam, 9 to 15 percent slopes, eroded	34	IVe-3	113	C
LaF	Landslides	34	VIIe-1	118	C
LeD2	Linne silty clay loam, 9 to 15 percent slopes, eroded	35	IIIe-1	111	C
LeE2	Linne silty clay loam, 15 to 30 percent slopes, eroded	34	IVe-1	113	C
LeF2	Linne silty clay loam, 30 to 50 percent slopes, eroded	35	VIe-1	115	C
LkF	Lodo rocky loam, 30 to 50 percent slopes	35	VIIe-8	119	D
LoD2	Los Osos clay loam, 9 to 15 percent slopes, eroded	36	IIIe-1	111	C
LoE2	Los Osos clay loam, 15 to 30 percent slopes, eroded	36	IVe-1	113	C
LoF	Los Osos clay loam, 30 to 50 percent slopes	36	VIe-1	115	C
MaD2	Malibu loam, 9 to 15 percent slopes, eroded	37	IVe-3	113	D
MaE2	Malibu loam, 15 to 30 percent slopes, eroded	37	VIe-3	116	D
MaF	Malibu loam, 30 to 50 percent slopes	37	VIIe-3	119	D
McA	Metz loamy fine sand, 0 to 2 percent slopes	39	IIs-4	111	A
McC	Metz loamy fine sand, 2 to 9 percent slopes	39	IIs-4	111	A
MeA	Metz loamy sand, 0 to 2 percent slopes	38	IIIs-4	113	A
MeC	Metz loamy sand, 2 to 9 percent slopes	38	IIIs-4	113	A
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes	38	IIs-4	111	B
MhF	Millsholm loam, 15 to 50 percent slopes	39	VIIe-8	119	D
MkG	Millsholm very rocky loam, 30 to 75 percent slopes	40	VIIs-8	120	D
MmF2	Millsholm-Malibu complex, 30 to 50 percent slopes, eroded	40			
	Millsholm	--	VIIe-8	119	D
	Malibu	--	VIIe-3	119	D
MoA	Mocho loam, 0 to 2 percent slopes	40	I-1	109	B
MoC	Mocho loam, 2 to 9 percent slopes	41	IIe-1	109	B
MrC	Mocho gravelly loam, 2 to 9 percent slopes	41	IIe-1	109	B
MsA	Mocho clay loam, 0 to 2 percent slopes	41	I-1	109	C
MsB	Mocho clay loam, 2 to 5 percent slopes	41	IIe-1	109	C
NaD2	Nacimiento silty clay loam, 9 to 15 percent slopes, eroded	42	IIIe-1	111	C

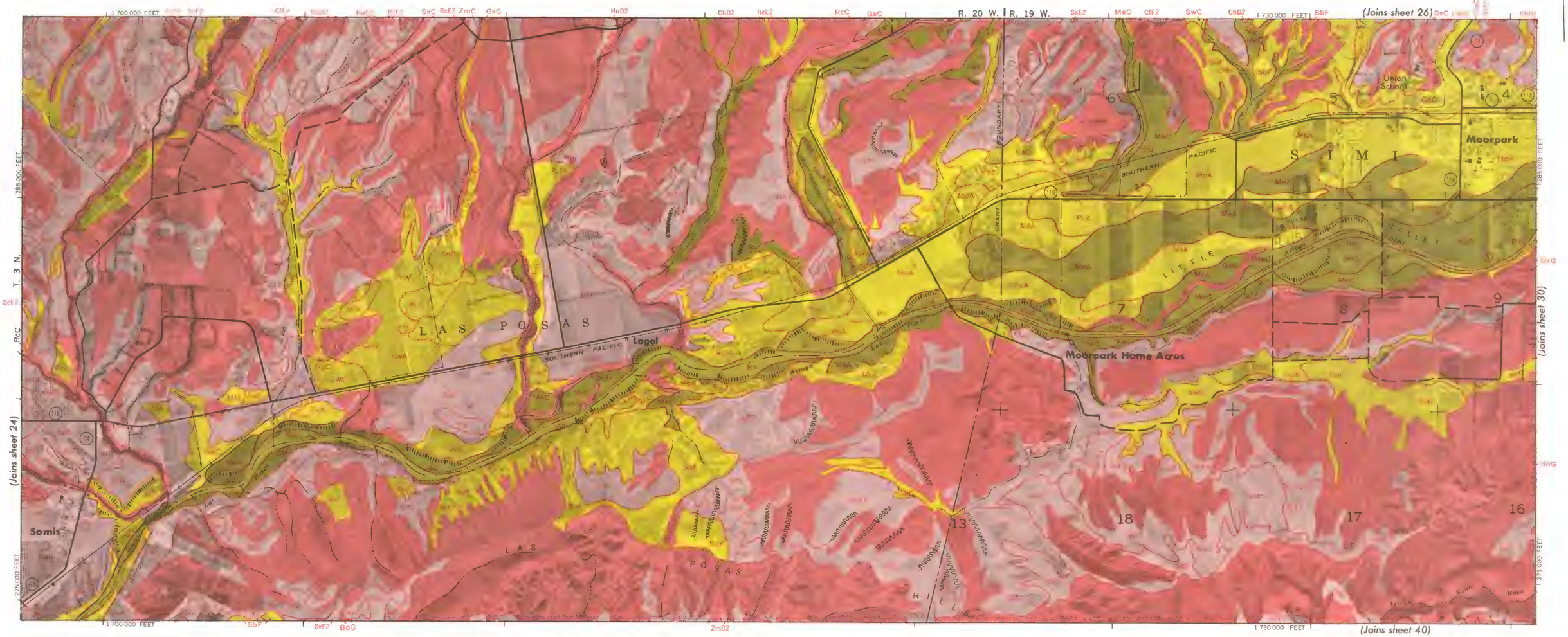
Map symbol	Mapping unit	Described on page	Capability unit		Hydrologic group
			Symbol	Page	
NaE2	Nacimiento silty clay loam, 15 to 30 percent slopes, eroded	42	IVe-1	113	C
NaF	Nacimiento silty clay loam, 30 to 50 percent slopes	41	VIe-1	115	C
NaG	Nacimiento silty clay loam, 50 to 75 percent slopes	42	VIIe-1	118	C
OhA	Ojai very fine sandy loam, 0 to 2 percent slopes	42	IIs-1	110	C
OhC2	Ojai very fine sandy loam, 2 to 9 percent slopes, eroded	44	IIIe-1	111	C
OhD2	Ojai very fine sandy loam, 9 to 15 percent slopes, eroded	44	IVe-1	113	C
OsD2	Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded	43	IVe-7	114	C
OsE2	Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded	43	VIe-7	117	C
Pa	Pacheco silty clay loam	44	IIw-2	110	C
PcA	Pico sandy loam, 0 to 2 percent slopes	45	IIs-4	111	B
PcC	Pico sandy loam, 2 to 9 percent slopes	46	IIe-1	109	B
PsA	Pico loam, sandy substratum, 0 to 2 percent slopes	46	IIIs-0	112	B
PxG	Pits and dumps	46	VIIIs-1	121	C
RcC	Rincon silty clay loam, 2 to 9 percent slopes	46	IIe-3	109	D
RcD2	Rincon silty clay loam, 9 to 15 percent slopes, eroded	47	IIIe-3	112	D
RcE2	Rincon silty clay loam, 15 to 30 percent slopes, eroded	47	IVe-3	113	D
RcE3	Rincon silty clay loam, 9 to 30 percent slopes, severely eroded	47	VIe-3	116	D
Rw	Riverwash	48	VIIIw-4	121	A
SaA	Salinas clay loam, 0 to 2 percent slopes	48	I-1	109	C
SaC	Salinas clay loam, 2 to 9 percent slopes	49	IIe-1	109	C
SbF	San Andreas sandy loam, 30 to 50 percent slopes	49	VIIe-1	118	B
ScD2	San Benito clay loam, 9 to 15 percent slopes, eroded	50	IIIe-1	111	C
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded	50	IVe-1	113	C
ScF2	San Benito clay loam, 30 to 50 percent slopes, eroded	50	VIe-1	115	C
ScG	San Benito clay loam, 50 to 75 percent slopes	50	VIIe-1	118	C
Sd	Sandy alluvial land	51	IVw-4	114	A
SeE	Santa Lucia shaly silty clay loam, 15 to 30 percent slopes	51	IVe-1	113	C
SeF	Santa Lucia shaly silty clay loam, 30 to 50 percent slopes	51	VIe-1	115	C
SeG	Santa Lucia shaly silty clay loam, 50 to 75 percent slopes	52	VIIe-1	118	C
ShE	Saugus sandy loam, 5 to 30 percent slopes	53	VIe-1	115	B
ShF2	Saugus sandy loam, 30 to 50 percent slopes, eroded	52	VIIe-1	118	B
SnG	Sedimentary rock land	53	VIIIs-1	121	D
SoE2	Sespe clay loam, 15 to 30 percent slopes, eroded	54	IVe-1	113	C
SoF	Sespe clay loam, 30 to 50 percent slopes	54	VIe-1	115	C
SoG	Sespe clay loam, 50 to 75 percent slopes	53	VIIe-1	118	C
SsE2	Soper loam, 15 to 30 percent slopes, eroded	55	VIe-1	115	C
SvF2	Soper gravelly loam, 30 to 50 percent slopes, eroded	54	VIIe-1	118	C
SwA	Sorrento loam, 0 to 2 percent slopes	55	I-1	109	B
SwC	Sorrento loam, 2 to 9 percent slopes	56	IIe-1	109	B
SxA	Sorrento silty clay loam, 0 to 2 percent slopes	56	I-1	109	C
SxC	Sorrento silty clay loam, 2 to 9 percent slopes	56	IIe-1	109	C
SzC	Sorrento clay loam, heavy variant, 2 to 9 percent slopes	56	IIe-1	109	C
SzD	Sorrento clay loam, heavy variant, 9 to 15 percent slopes	57	IIIe-1	111	C
TeF	Terrace escarpments	57	VIIe-1	118	C
Ts	Tidal flats	57	VIIIw-6	121	D
VaA	Vina loam, 0 to 2 percent slopes	58	I-1	109	B
VaC	Vina loam, 2 to 9 percent slopes	57	IIe-1	109	B
VnC	Vina gravelly loam, 2 to 9 percent slopes	58	IIe-1	109	B
VsC	Vina silty clay loam, 2 to 9 percent slopes	58	IIe-1	109	C
ZmC	Zamora loam, 2 to 9 percent slopes	58	IIe-1	109	C
ZmD2	Zamora loam, 9 to 15 percent slopes, eroded	59	IIIe-1	111	C

U. S. GOVERNMENT PRINTING OFFICE : 1970 O - 371-552

DETAILED, HYDROLOGIC SOIL GROUPS - VENTURA AREA, CALIFORNIA - SHEET 27

LEGEND

- Group A
- Group B
- Group C
- Group D



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

Scale 1:24 000

This map is suitable for operational planning but is not to be used as a substitute for on site investigation.

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE - USDA-SCS-PORTLAND, OREG. 1969

M7 - 0 - 21343 - 3A

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (Fy)
- Ford (Ford)
- Grade
- R. R. over
- R. R. under
- Tunnel (Tunnel)

Buildings
- School
- Church

Mine and quarry

Pit, gravel

Power line

Pipeline

Cemetery

Dams

Levee

Well, oil or gas

BOUNDARIES

- National or state
- County
- Project area
- Reservation
- Land grant
- Small park, cemetery, airport
- Land division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

SOIL SURVEY DATA

Soil boundary and symbol (Dx)

Gravel

Stony Very stony

Rock outcrops

Chert fragments

Clay spot

Sand spot

Sandy areas

Gumbo or scabby spot

Made land

Severely eroded spot

Blowout, wind erosion

Gully

Kitchen midden

Landslide or slip

Detrimental deposit

Soil sample site

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions, unclassified (Large, Small)

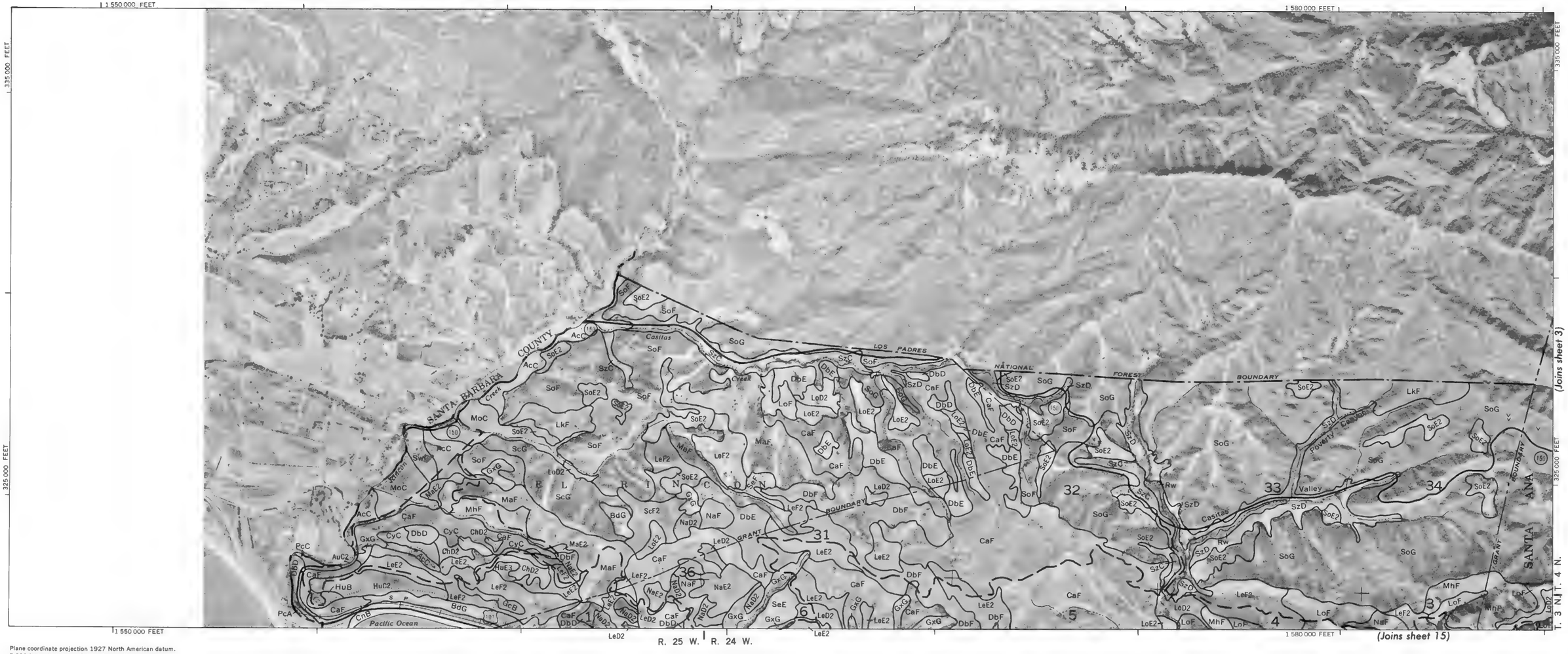
Soil map constructed 1969 by Cartographic Division, Soil Conservation Service, USDA, from 1959 and 1965 aerial photographs. Controlled mosaic based on California plane coordinate system, zone 5, Lambert conformal conic projection, 1927 North American datum.

SOIL LEGEND

Each symbol consists of a combination of letters and numbers. The first capital letter is the initial one of the soil name. The second capital letter, if used, shows the slope. Symbols without a slope letter are those of nearly level soils or land types. A final number, 2 or 3, in a symbol shows that the soil is eroded or severely eroded.

SYMBOL	NAME
AcA	Anacapa sandy loam, 0 to 2 percent slopes
AcC	Anacapa sandy loam, 2 to 9 percent slopes
AnC	Anacapa gravelly sandy loam, 2 to 9 percent slopes
AsF	Arnold sand, 9 to 50 percent slopes
AuB	Azule loam, 0 to 5 percent slopes
AuC2	Azule loam, 2 to 9 percent slopes, eroded
AuD	Azule loam, 9 to 15 percent slopes
AzC	Azule gravelly loam, 5 to 9 percent slopes
BdG	Badland
CaE2	Calleguas shaly loam, 9 to 30 percent slopes, eroded
CaF	Calleguas shaly loam, 30 to 50 percent slopes
CbF2	Calleguas-Arnold complex, 30 to 50 percent slopes, eroded
Cc	Camarillo sandy loam
Cd	Camarillo loam
Ce	Camarillo loam, sandy substratum
CfD2	Castaic-Balcom complex, 9 to 15 percent slopes, eroded
CfE	Castaic-Balcom complex, 15 to 30 percent slopes
CfF2	Castaic-Balcom complex, 30 to 50 percent slopes, eroded
CfG2	Castaic-Balcom complex, 50 to 65 percent slopes, eroded
CgG2	Castaic and Saugus soils, 30 to 75 percent slopes, eroded
ChD2	Chesterton coarse sandy loam, 5 to 15 percent slopes, eroded
CkE3	Chesterton sandy loam, 9 to 30 percent slopes, severely eroded
CmD	Cibo clay, 5 to 15 percent slopes
CmE	Cibo clay, 15 to 30 percent slopes
CnB	Coastal beaches
CoA	Corralitos loamy sand, 0 to 2 percent slopes
CoC	Corralitos loamy sand, 2 to 9 percent slopes
CrC	Cortina stony sandy loam, 2 to 9 percent slopes
CsD	Cortina very stony sandy loam, 9 to 15 percent slopes
CyA	Cropley clay, 0 to 2 percent slopes
CyC	Cropley clay, 2 to 9 percent slopes
Cz	Cropley clay, calcareous variant
DbD	Diablo clay, 9 to 15 percent slopes
DbE	Diablo clay, 15 to 30 percent slopes
DbF	Diablo clay, 30 to 50 percent slopes
Fd	Fill land
GaA	Garretson loam, 0 to 2 percent slopes
GaC	Garretson loam, 2 to 9 percent slopes
GbC	Garretson gravelly loam, 2 to 9 percent slopes
GcB	Garretson silt loam, calcareous variant, 2 to 5 percent slopes
GrF	Gaviota rocky sandy loam, 15 to 50 percent slopes
GsE	Gazos silty clay loam, 15 to 30 percent slopes
GsF	Gazos silty clay loam, 30 to 50 percent slopes
GsG	Gazos silty clay loam, 50 to 75 percent slopes
GtD	Gilroy clay loam, 9 to 15 percent slopes
GtE	Gilroy clay loam, 15 to 30 percent slopes
GvF	Gilroy very rocky clay loam, 15 to 50 percent slopes
GxG	Gullied land
HaG	Hambright very rocky loam, 15 to 75 percent slopes
HbF	Hambright rocky clay loam, 30 to 50 percent slopes
Hm	Hueneme loamy sand, loamy substratum
Hn	Hueneme sandy loam
HuB	Huerhuero very fine sandy loam, 0 to 5 percent slopes
HuC2	Huerhuero very fine sandy loam, 5 to 9 percent slopes, eroded
HuD2	Huerhuero very fine sandy loam, 9 to 15 percent slopes, eroded
HuE3	Huerhuero very fine sandy loam, 9 to 30 percent slopes, severely eroded
IrG	Igneous rock land
KmC2	Kimball sandy loam, 2 to 9 percent slopes, eroded
KmD2	Kimball sandy loam, 9 to 15 percent slopes, eroded
LaF	Landslides
LeD2	Linne silty clay loam, 9 to 15 percent slopes, eroded
LeE2	Linne silty clay loam, 15 to 30 percent slopes, eroded
LeF2	Linne silty clay loam, 30 to 50 percent slopes, eroded
LkF	Lodo rocky loam, 30 to 50 percent slopes
LoD2	Los Osos clay loam, 9 to 15 percent slopes, eroded
LoE2	Los Osos clay loam, 15 to 30 percent slopes, eroded
LoF	Los Osos clay loam, 30 to 50 percent slopes
MaD2	Malibu loam, 9 to 15 percent slopes, eroded
MaE2	Malibu loam, 15 to 30 percent slopes, eroded
MaF	Malibu loam, 30 to 50 percent slopes
McA	Metz loamy fine sand, 0 to 2 percent slopes
McC	Metz loamy fine sand, 2 to 9 percent slopes
MeA	Metz loamy sand, 0 to 2 percent slopes
MeC	Metz loamy sand, 2 to 9 percent slopes
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes
MhF	Millsholm loam, 15 to 50 percent slopes
MkG	Millsholm very rocky loam, 30 to 75 percent slopes
MmF2	Millsholm-Malibu complex, 30 to 50 percent slopes, eroded
MoA	Mocho loam, 0 to 2 percent slopes
MoC	Mocho loam, 2 to 9 percent slopes
MrC	Mocho gravelly loam, 2 to 9 percent slopes
MsA	Mocho clay loam, 0 to 2 percent slopes
MsB	Mocho clay loam, 2 to 5 percent slopes
NaD2	Nacimiento silty clay loam, 9 to 15 percent slopes, eroded
NaE2	Nacimiento silty clay loam, 15 to 30 percent slopes, eroded
NaF	Nacimiento silty clay loam, 30 to 50 percent slopes
NaG	Nacimiento silty clay loam, 50 to 75 percent slopes
OhA	Ojai very fine sandy loam, 0 to 2 percent slopes
OhC2	Ojai very fine sandy loam, 2 to 9 percent slopes, eroded
OhD2	Ojai very fine sandy loam, 9 to 15 percent slopes, eroded
OsD2	Ojai stony fine sandy loam, 2 to 15 percent slopes, eroded
OsE2	Ojai stony fine sandy loam, 15 to 30 percent slopes, eroded
Pa	Pacheco silty clay loam
PcA	Pico sandy loam, 0 to 2 percent slopes
PcC	Pico sandy loam, 2 to 9 percent slopes
PsA	Pico loam, sandy substratum, 0 to 2 percent slopes
PxG	Pits and dumps
RcC	Rincon silty clay loam, 2 to 9 percent slopes
RcD2	Rincon silty clay loam, 9 to 15 percent slopes, eroded
RcE2	Rincon silty clay loam, 15 to 30 percent slopes, eroded
RcE3	Rincon silty clay loam, 9 to 30 percent slopes, severely eroded
Rw	Riverwash
SaA	Salinas clay loam, 0 to 2 percent slopes
SaC	Salinas clay loam, 2 to 9 percent slopes
SbF	San Andreas sandy loam, 30 to 50 percent slopes
ScD2	San Benito clay loam, 9 to 15 percent slopes, eroded
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded
ScF2	San Benito clay loam, 30 to 50 percent slopes, eroded
ScG	San Benito clay loam, 50 to 75 percent slopes
Sd	Sandy alluvial land
SeE	Santa Lucia shaly silty clay loam, 15 to 30 percent slopes
SeF	Santa Lucia shaly silty clay loam, 30 to 50 percent slopes
SeG	Santa Lucia shaly silty clay loam, 50 to 75 percent slopes
ShE	Saugus sandy loam, 5 to 30 percent slopes
ShF2	Saugus sandy loam, 30 to 50 percent slopes, eroded
SnG	Sedimentary rock land
SoE2	Sespe clay loam, 15 to 30 percent slopes, eroded
SoF	Sespe clay loam, 30 to 50 percent slopes
SoG	Sespe clay loam, 50 to 75 percent slopes
SsE2	Soper loam, 15 to 30 percent slopes, eroded
SvF2	Soper gravelly loam, 30 to 50 percent slopes, eroded
SwA	Sorrento loam, 0 to 2 percent slopes
SwC	Sorrento loam, 2 to 9 percent slopes
SxA	Sorrento silty clay loam, 0 to 2 percent slopes
SxC	Sorrento silty clay loam, 2 to 9 percent slopes
SzC	Sorrento clay loam, heavy variant, 2 to 9 percent slopes
SzD	Sorrento clay loam, heavy variant, 9 to 15 percent slopes
TeF	Terrace escarpments
Ts	Tidal flats
VaA	Vina loam, 0 to 2 percent slopes
VaC	Vina loam, 2 to 9 percent slopes
VnC	Vina gravelly loam, 2 to 9 percent slopes
VsC	Vina silty clay loam, 2 to 9 percent slopes
ZmC	Zamora loam, 2 to 9 percent slopes
ZmD2	Zamora loam, 9 to 15 percent slopes, eroded

VENTURA AREA, CALIFORNIA NO. 1



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

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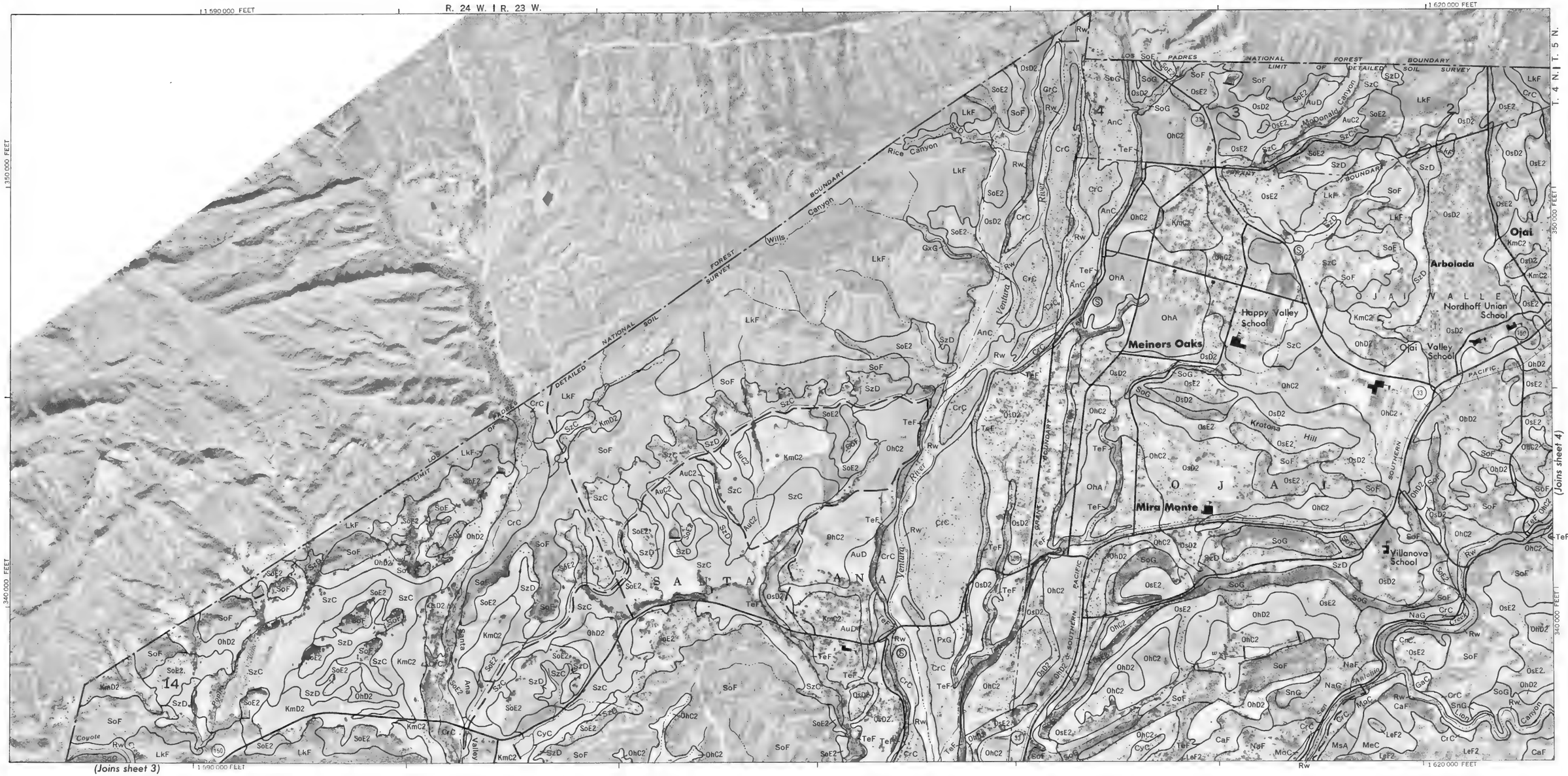
Scale 1:24000

VENTURA AREA, CALIFORNIA — SHEET NUMBER 2



VENTURA AREA, CALIFORNIA NO. 2

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station

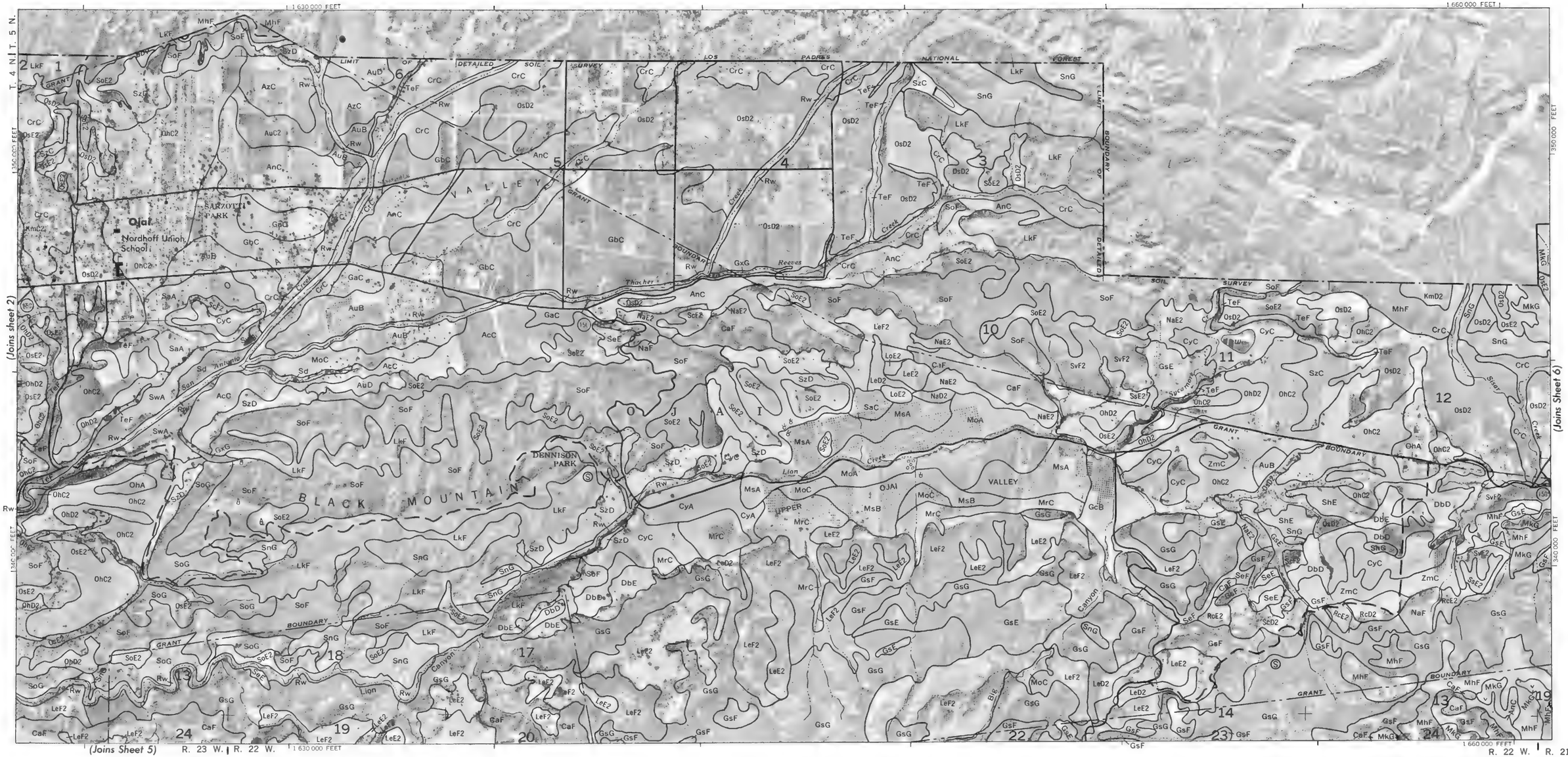
Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Land division corners are approximately positioned on this map

VENTURA AREA, CALIFORNIA NO. 3

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

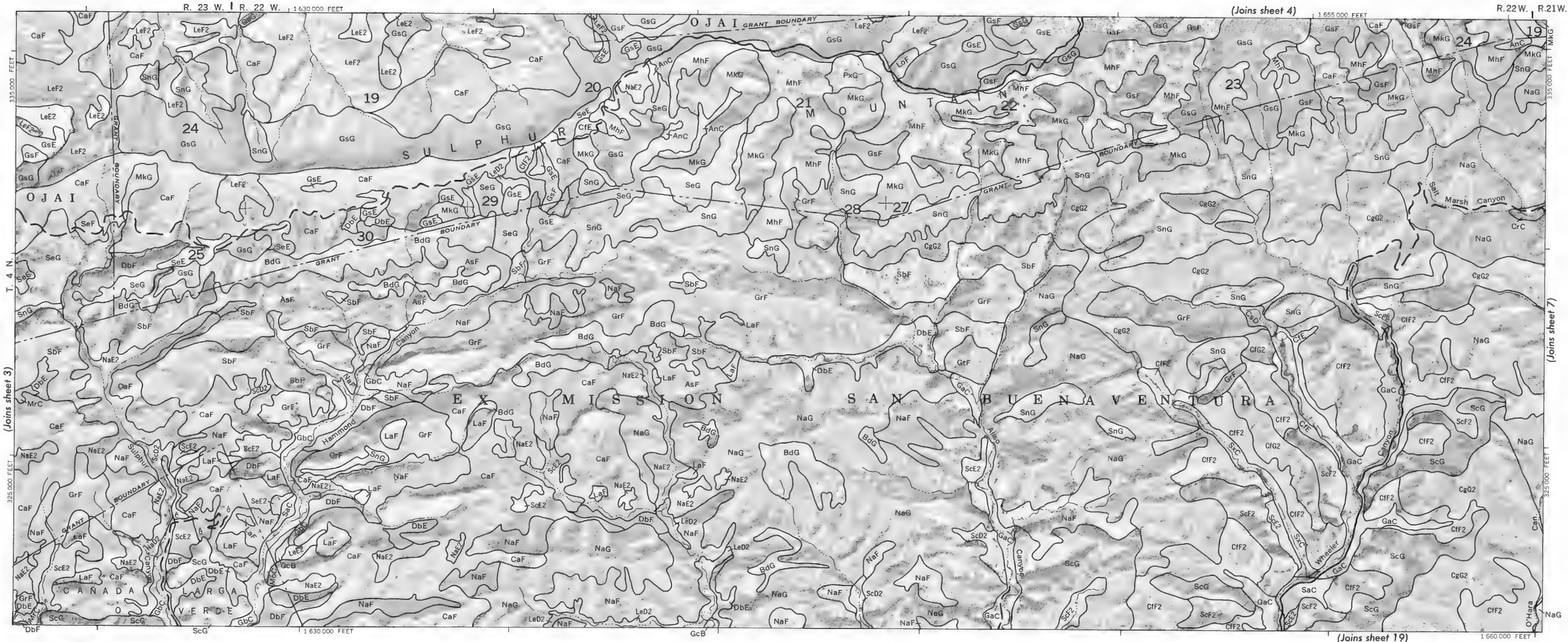


VENTURA AREA, CALIFORNIA NO. 4

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station

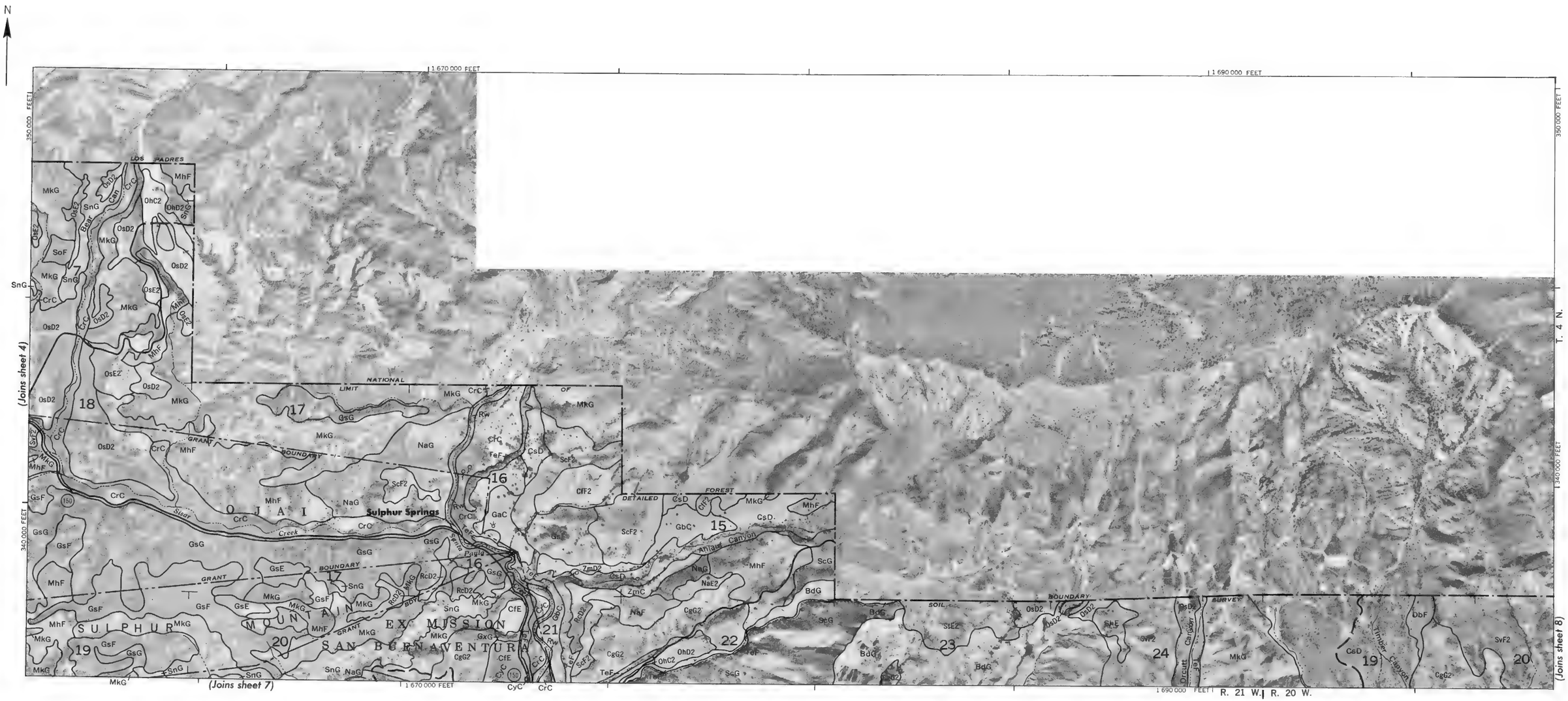
VENTURA AREA, CALIFORNIA NO. 5



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA — SHEET NUMBER 6



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

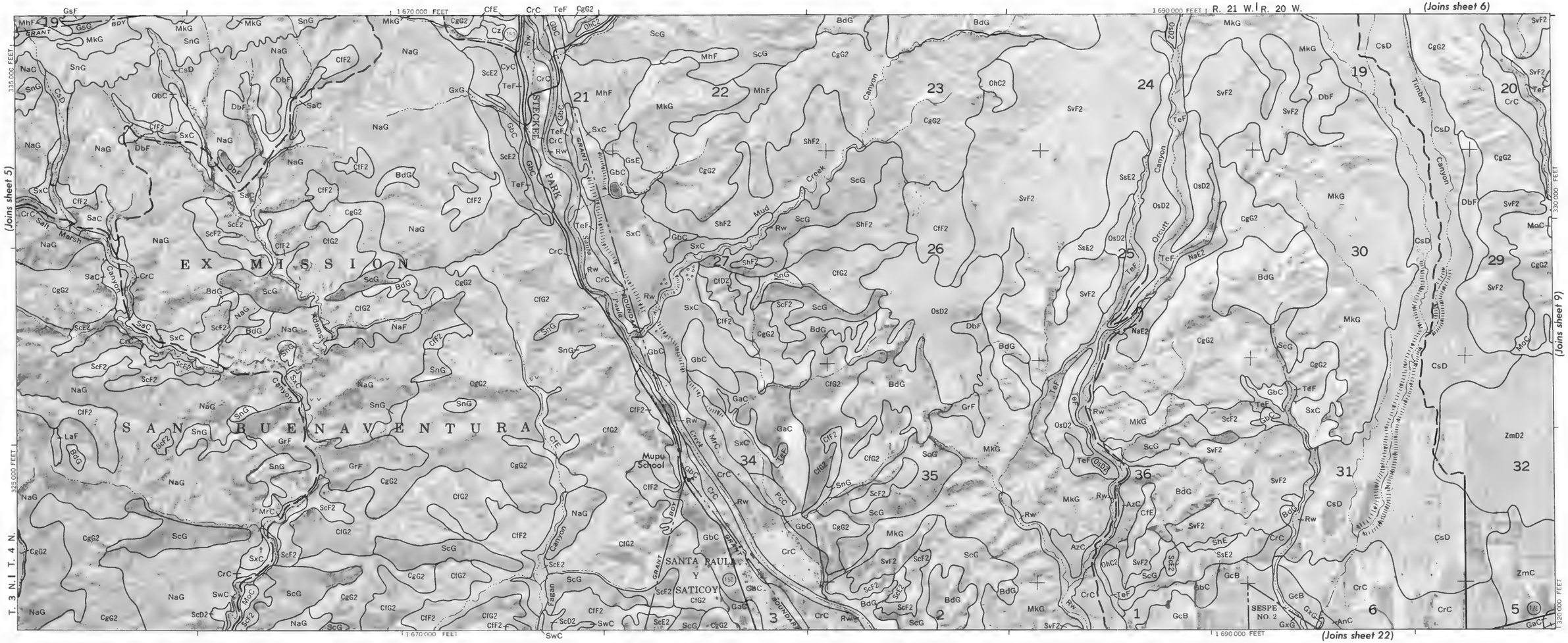
1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 6

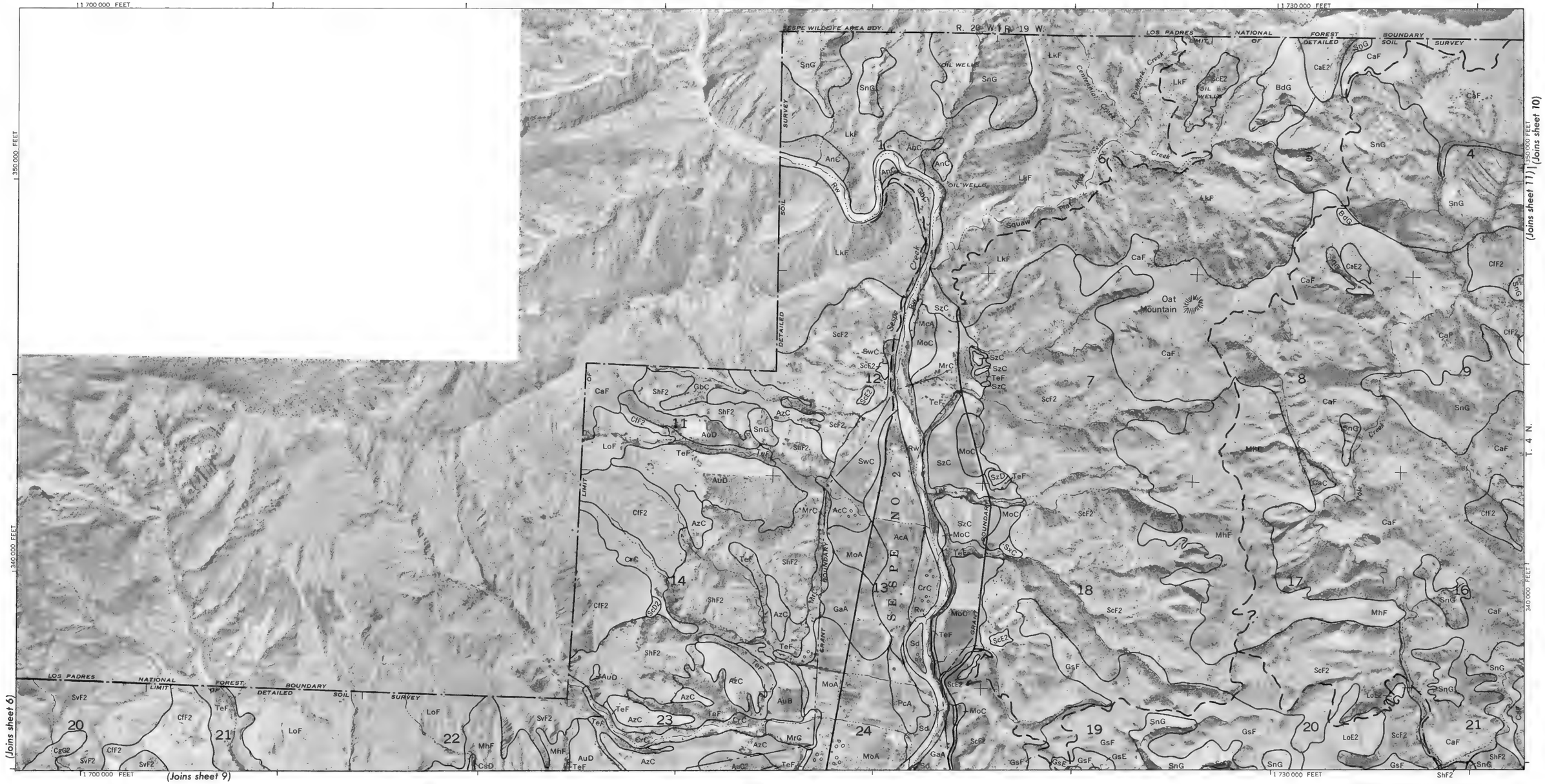
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 7



VENTURA AREA, CALIFORNIA — SHEET NUMBER 8



VENTURA AREA, CALIFORNIA NO. 8

Scale 1:24000

2 Miles
10000 Feet
5000

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

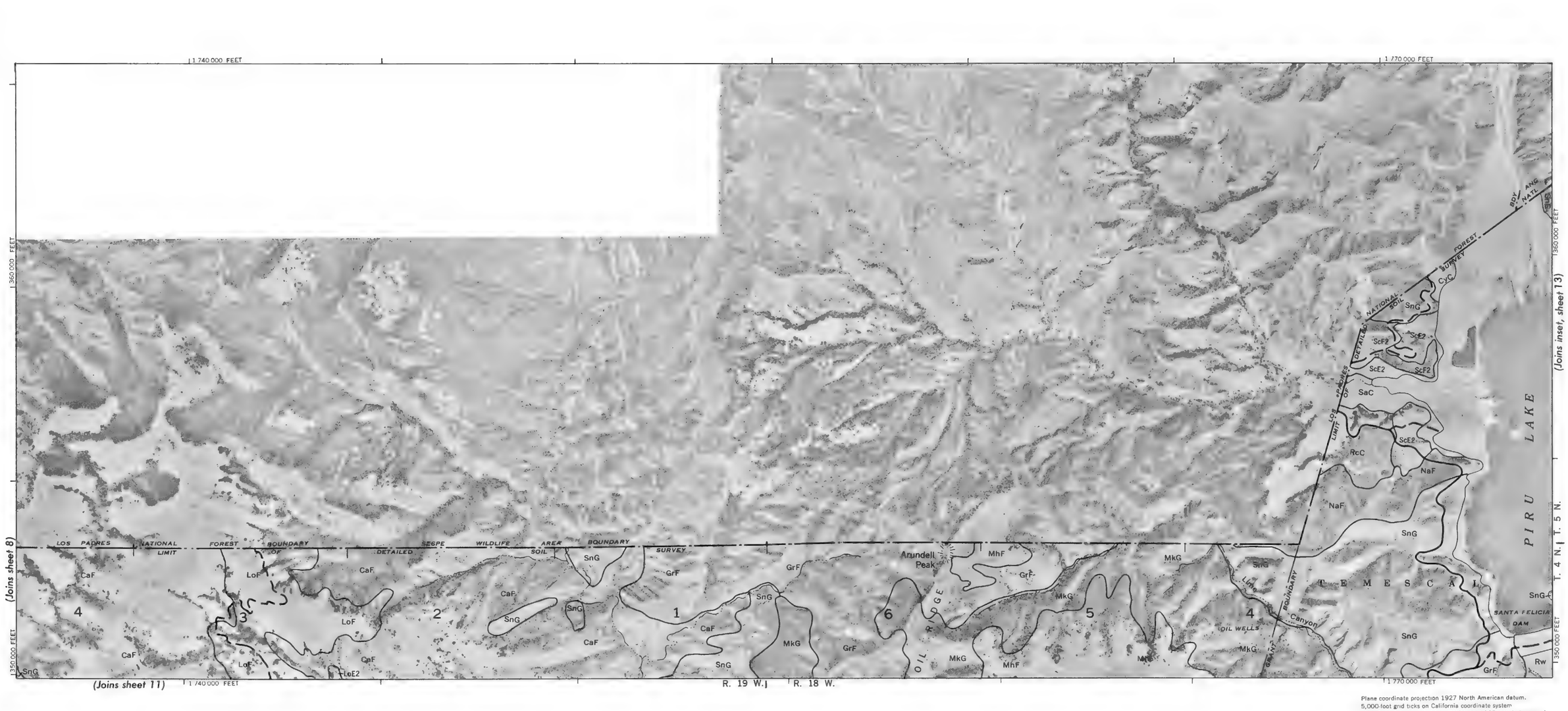
Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

VENTURA AREA, CALIFORNIA NO. 9

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA — SHEET NUMBER 10



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

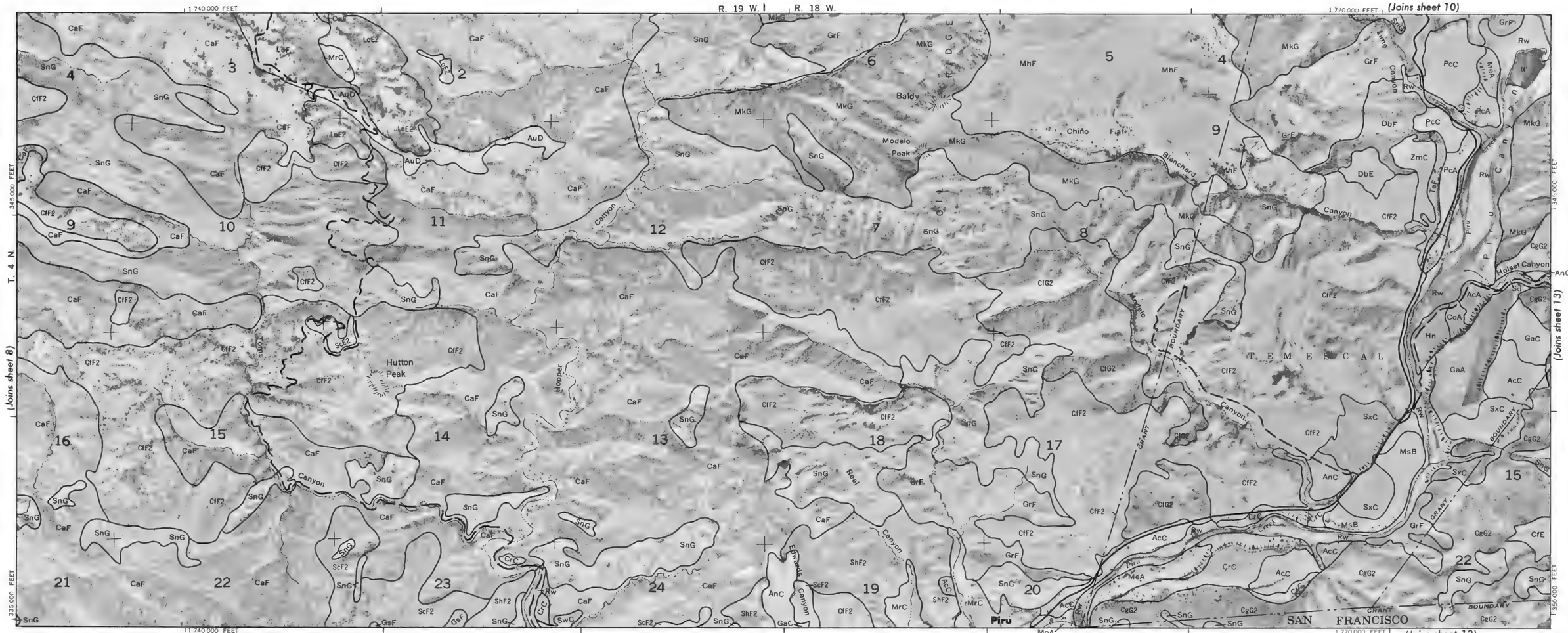
1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 10

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 11

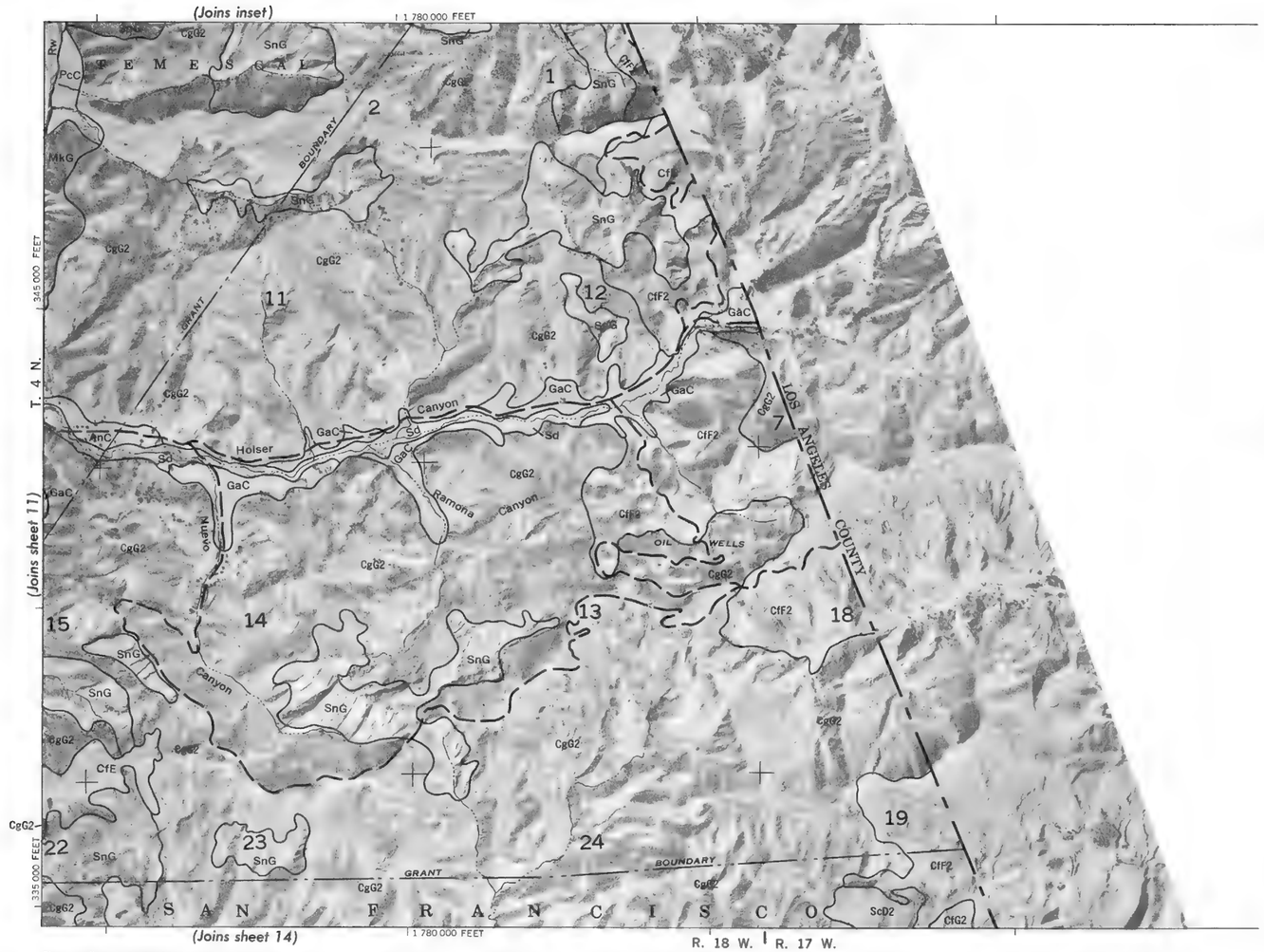


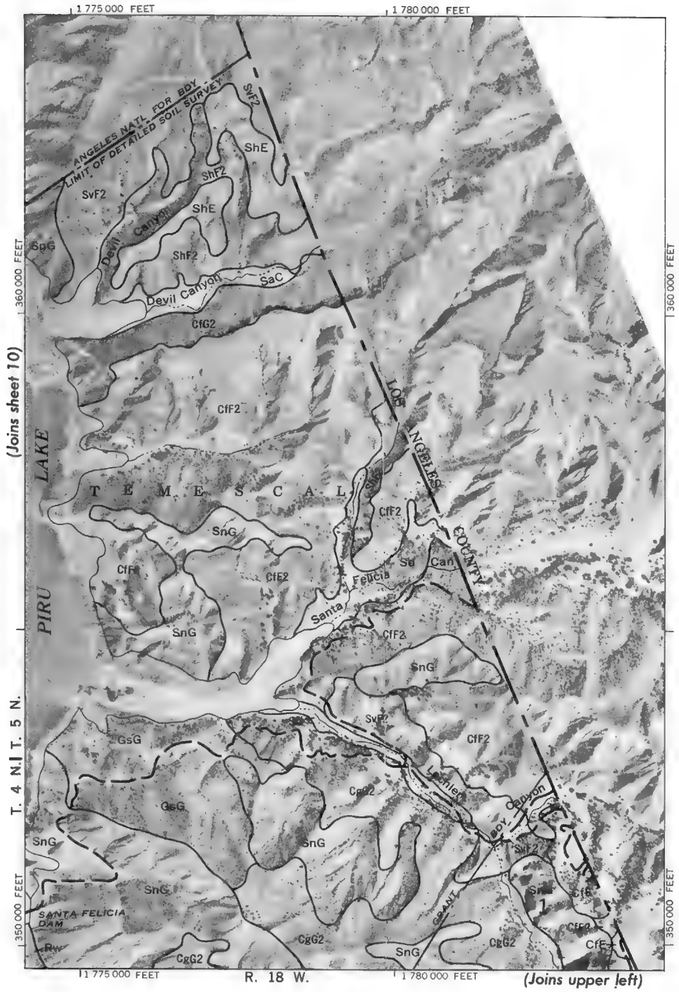
N

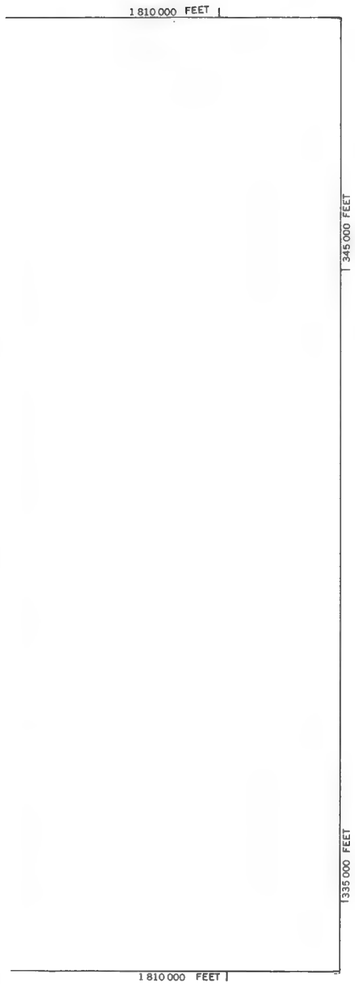
Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000


N
(Joins sheet 11)
1 740 000 FEET
R. 19 W.
R. 18 W.
1 770 000 FEET
330 000 FEET
320 000 FEET
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 28)
Sulphur Mountain
Fairview Canyon
Buckhorn
Piru
Red Wash
Piru Creek
PERCOLATION BASIN
Santa Clara River
Santa Clara DITCH
Camulos
SOUTHERN PACIFIC
SESPE NO 2
GRANT
PACIFIC SOUTHERN
Calumet Canyon
Frey Canyon
Wiley Canyon
Torrey Canyon
Smith Canyon
Eureka Canyon
SAN FRANCISCO
GRANT BOUNDARY
T. 3 N. | T. 4 N.
VENTURA AREA, CALIFORNIA NO. 12
Land division corners are approximately positioned on this map.
This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.
1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



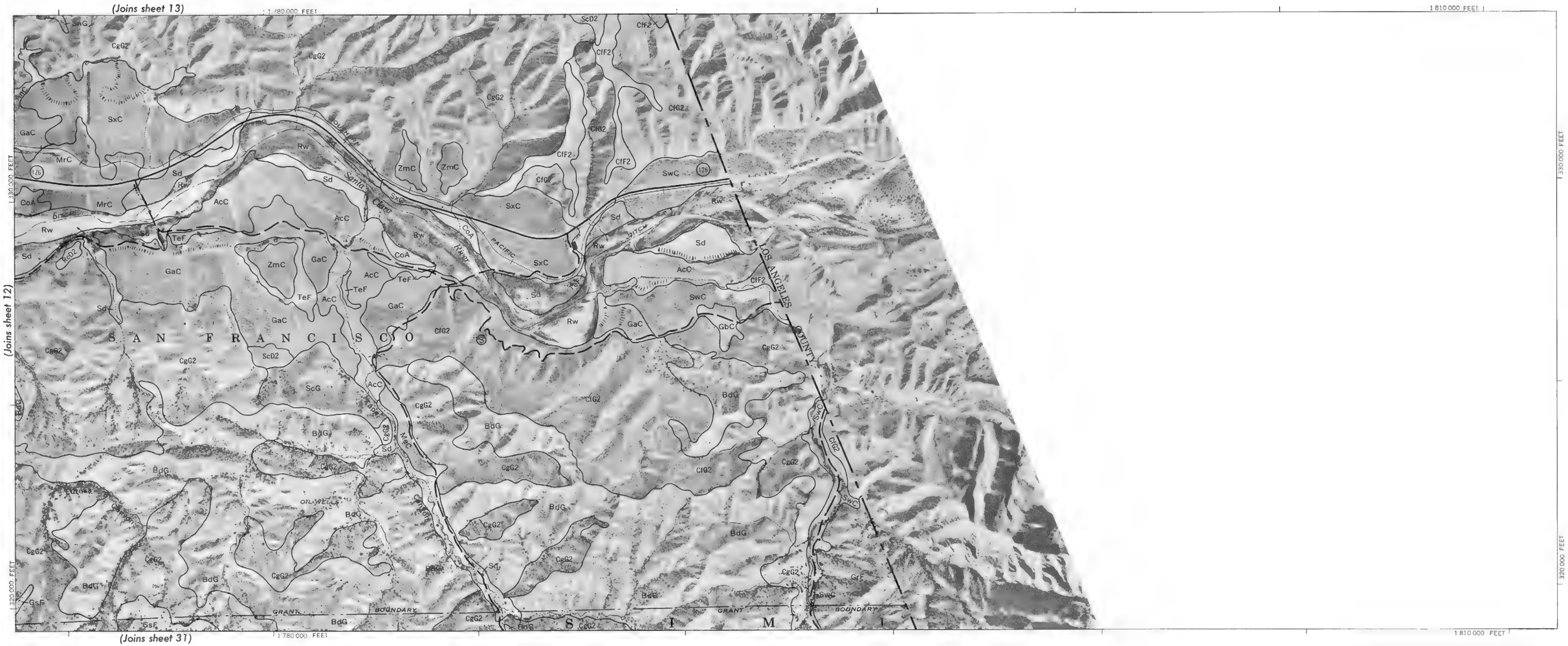




N

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

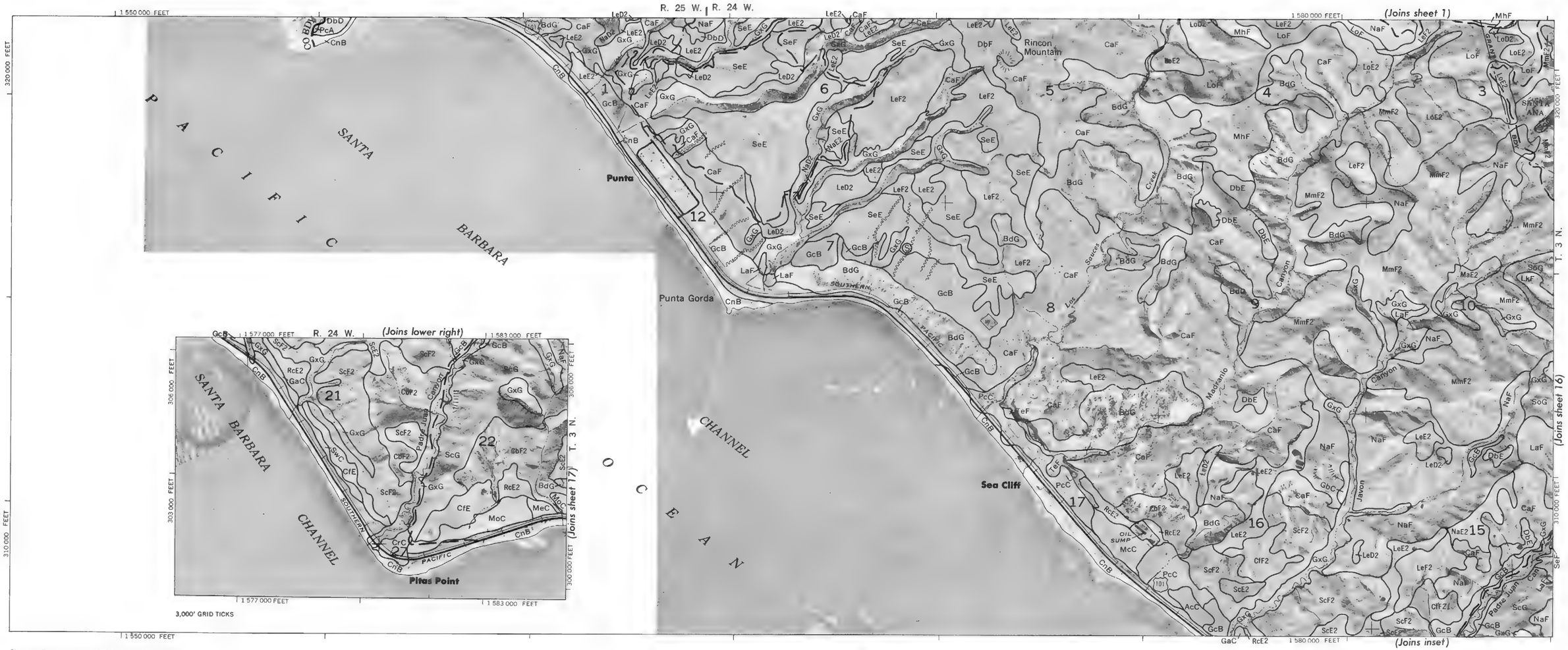
1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

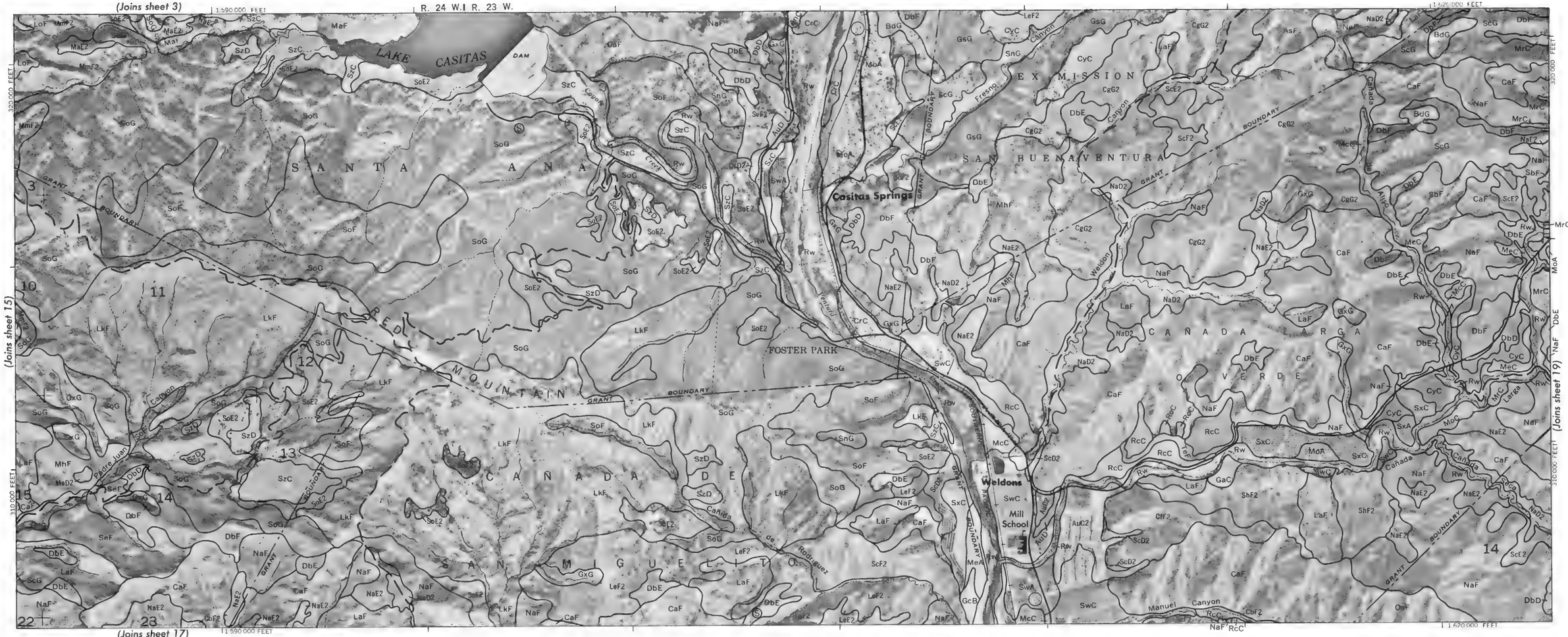
VENTURA AREA, CALIFORNIA NO. 14

VENTURA AREA, CALIFORNIA NO. 15



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24000



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 16

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 17

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

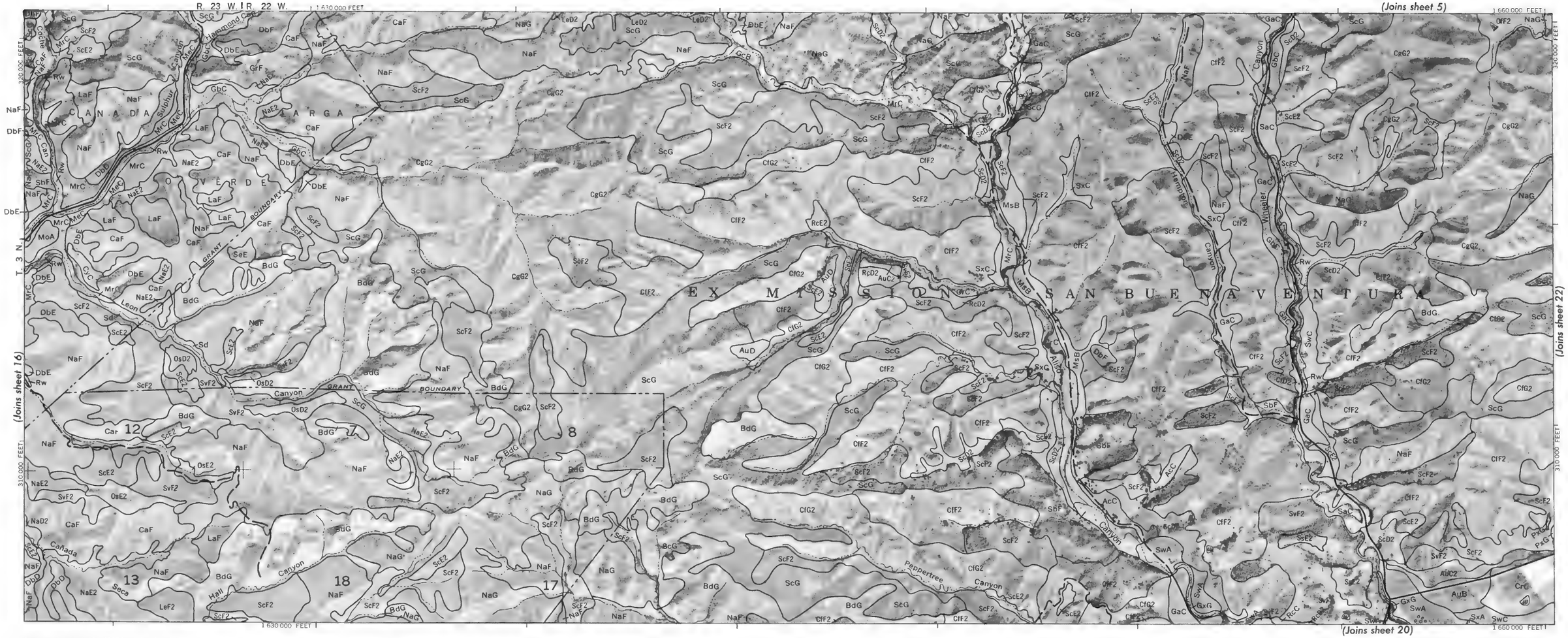
VENTURA AREA, CALIFORNIA NO. 18

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

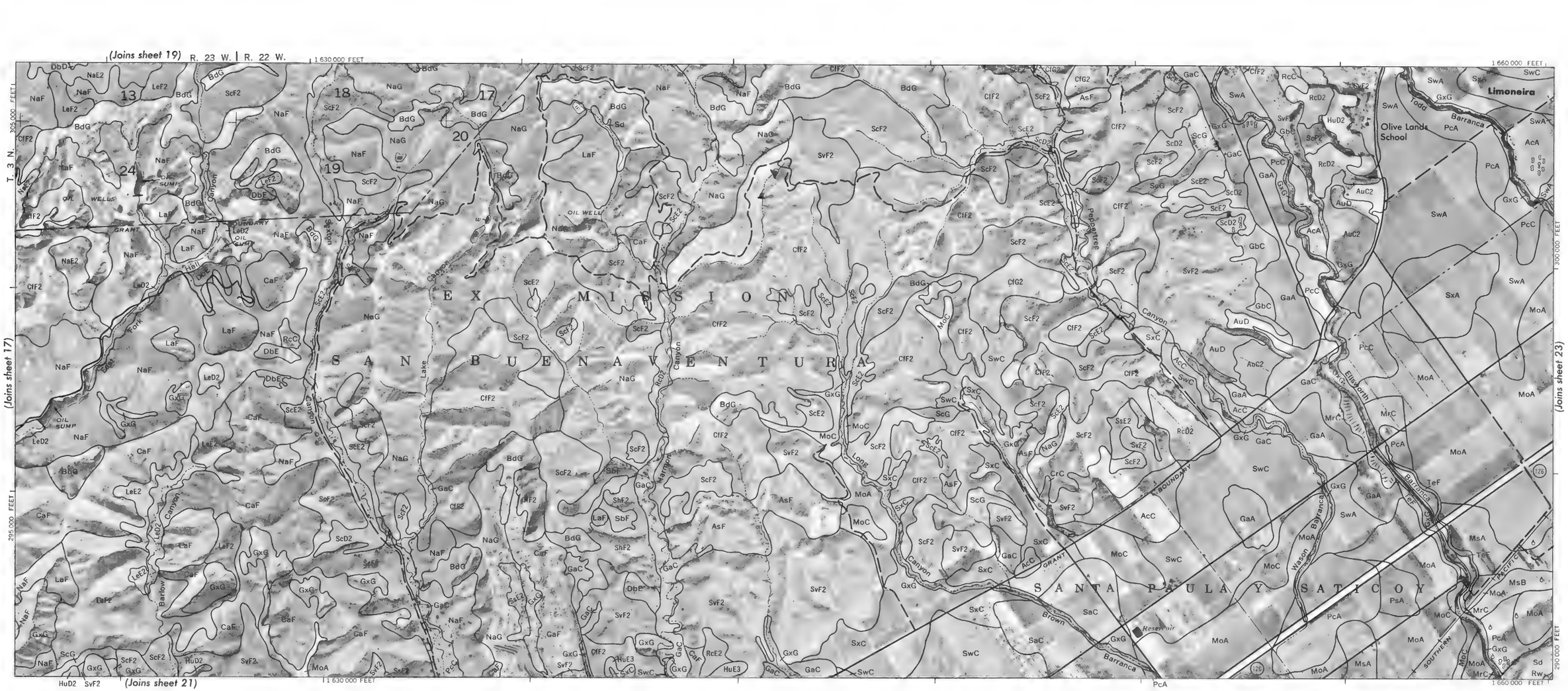
This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

VENTURA AREA, CALIFORNIA NO. 19



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

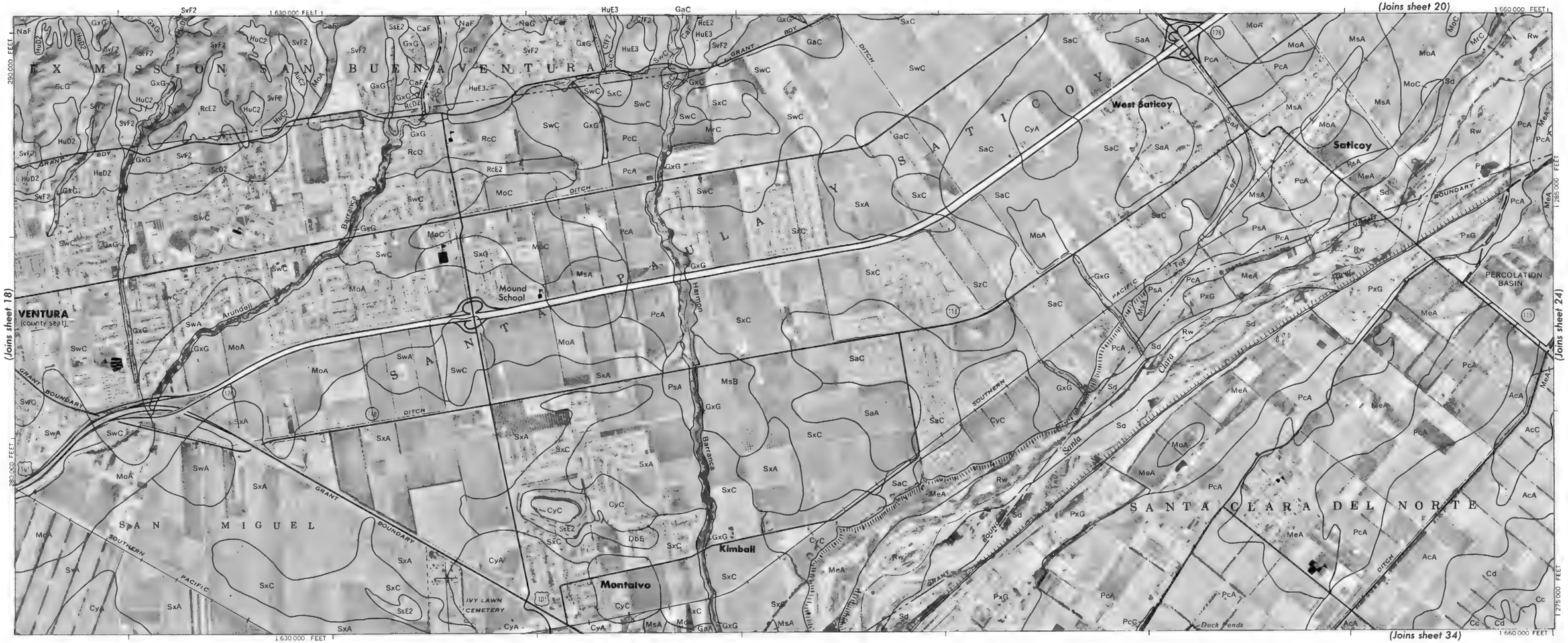
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 20

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Land division corners are approximately positioned on this map.
VENTURA AREA, CALIFORNIA NO. 21



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs

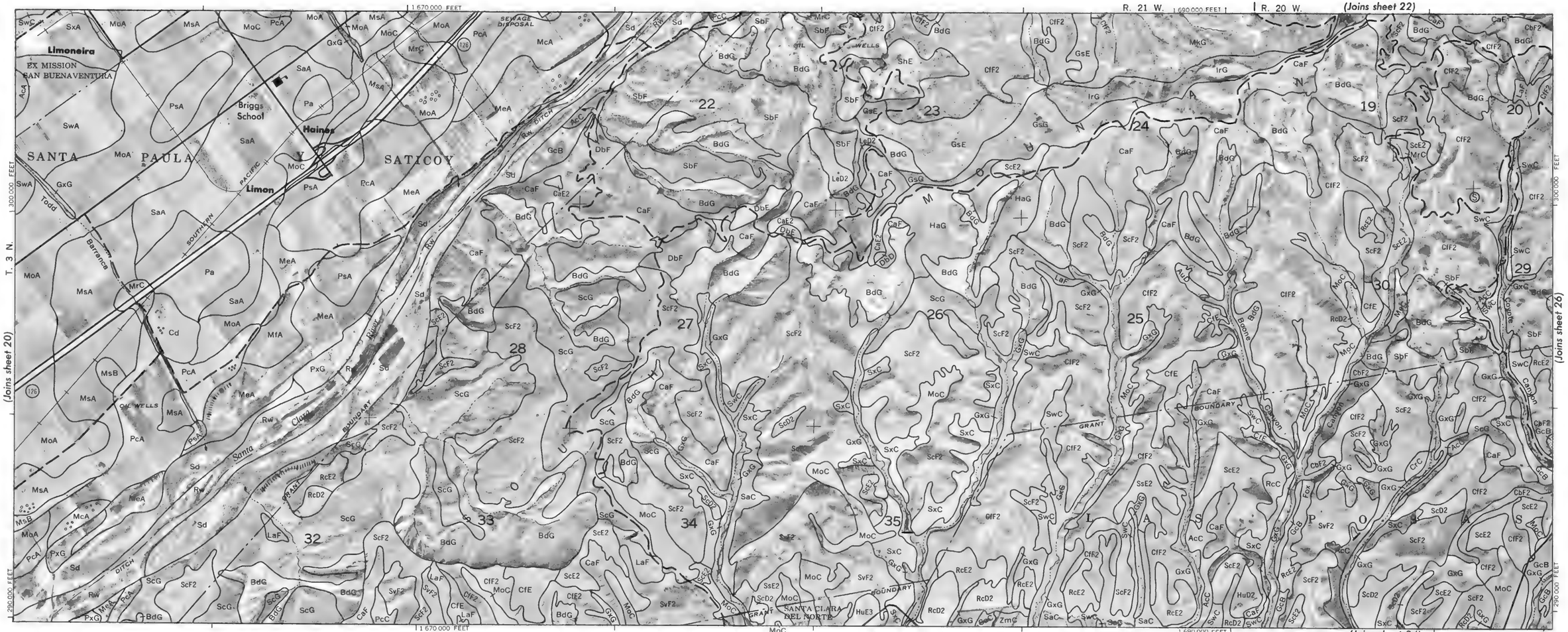
1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 22

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 23



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5 000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

Plane coordinate projection 1927 North American datum
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs

1 ¾ ½ ¼ 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 24

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station

VENTURA AREA, CALIFORNIA NO. 25

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

Scale 1:24000

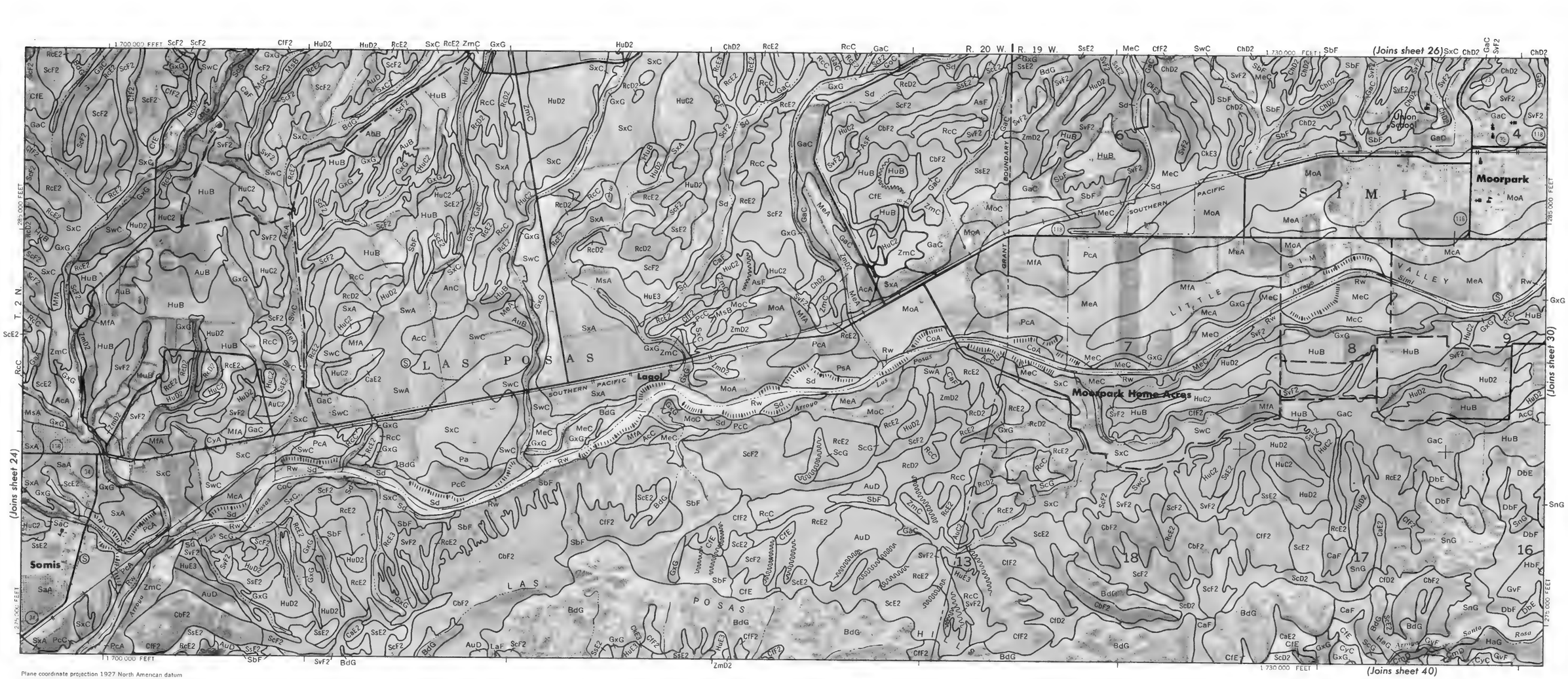
VENTURA AREA, CALIFORNIA NO. 26

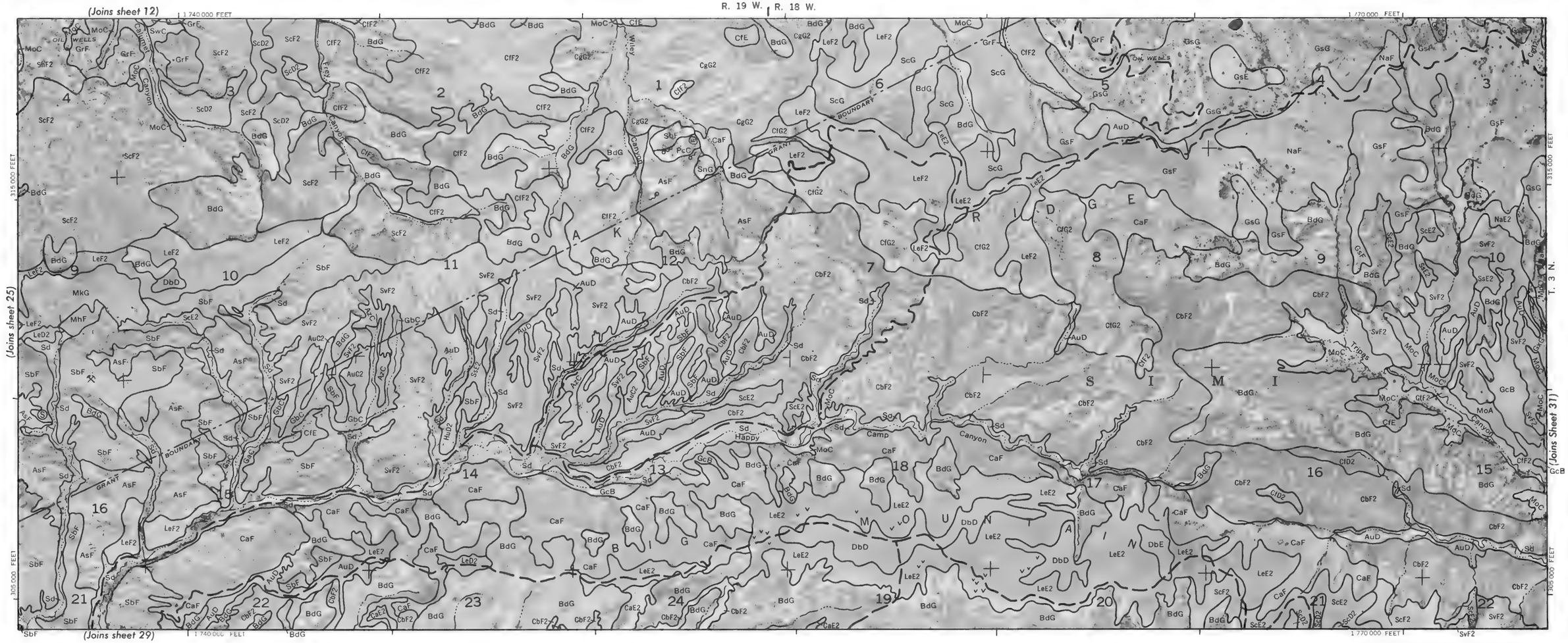
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the University of California Agricultural Experiment Station.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station
Land division corners are approximately positioned on this map.

VENTURA AREA, CALIFORNIA NO.





Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

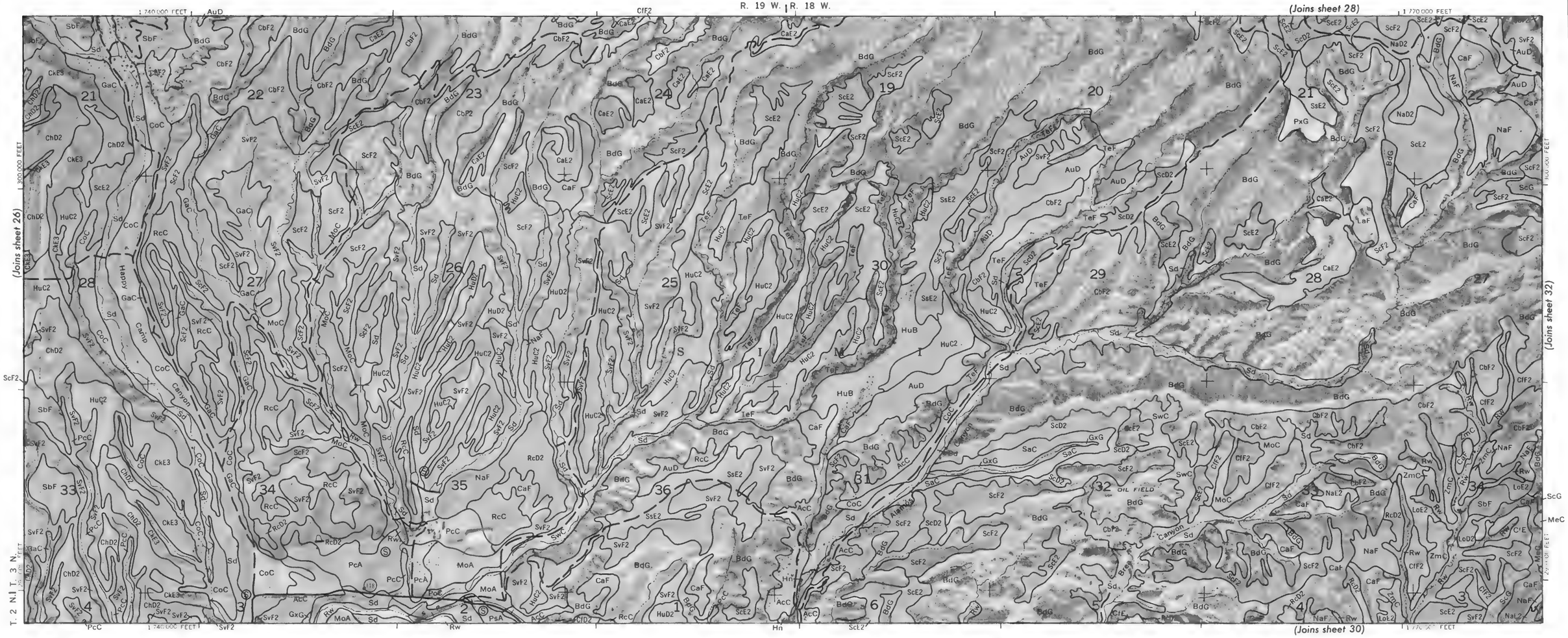
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 28

Land division corners are approximately positioned on this map.

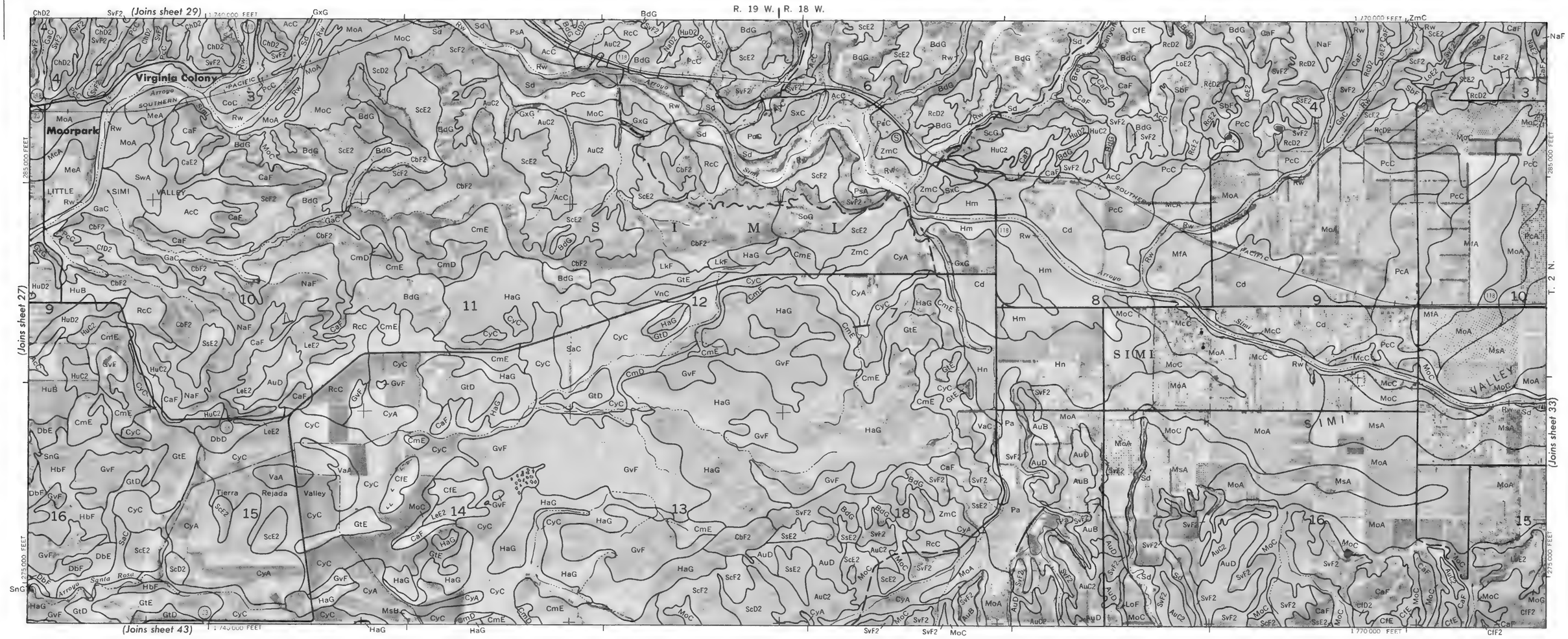
This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 29



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¼ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



1 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

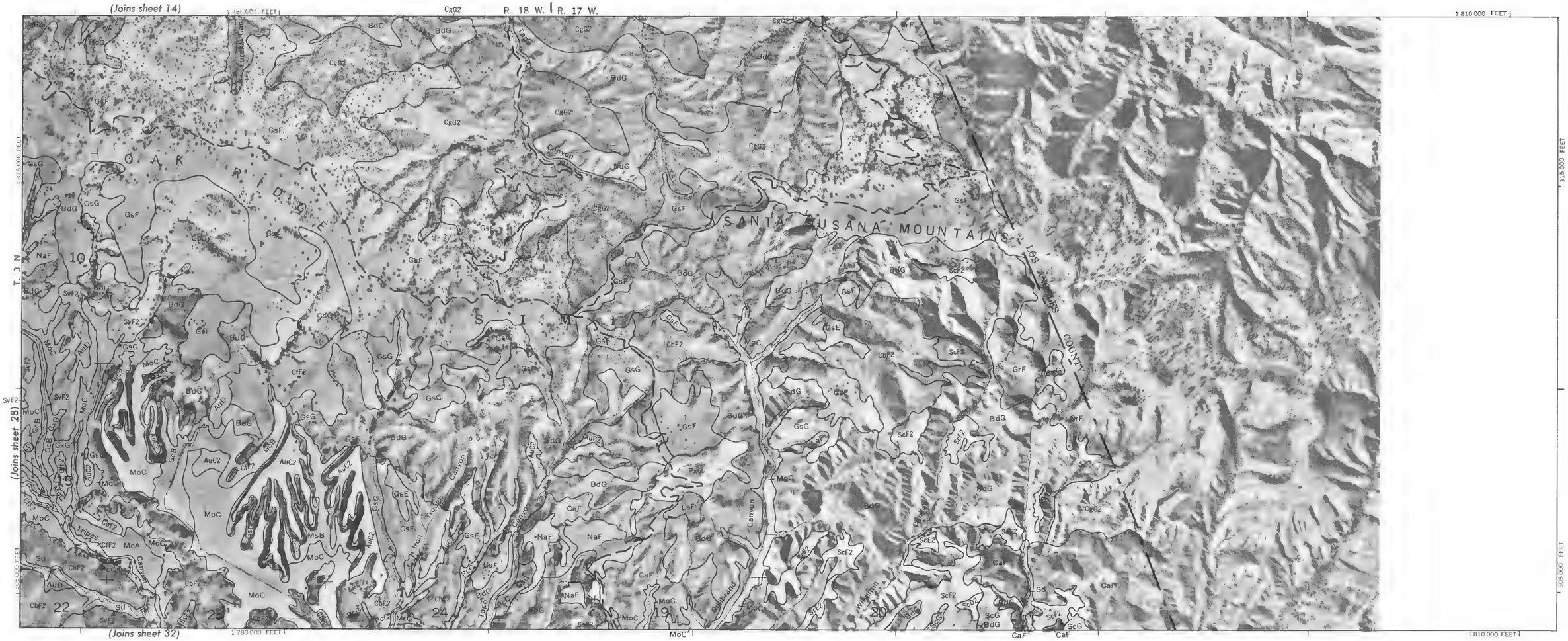
Plane coordinate projection 1927 North American datum
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

VENTURA AREA, CALIFORNIA NO. 30

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station

VENTURA AREA, CALIFORNIA NO. 31



Plane coordinate projection 1927 North American datum
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24000

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

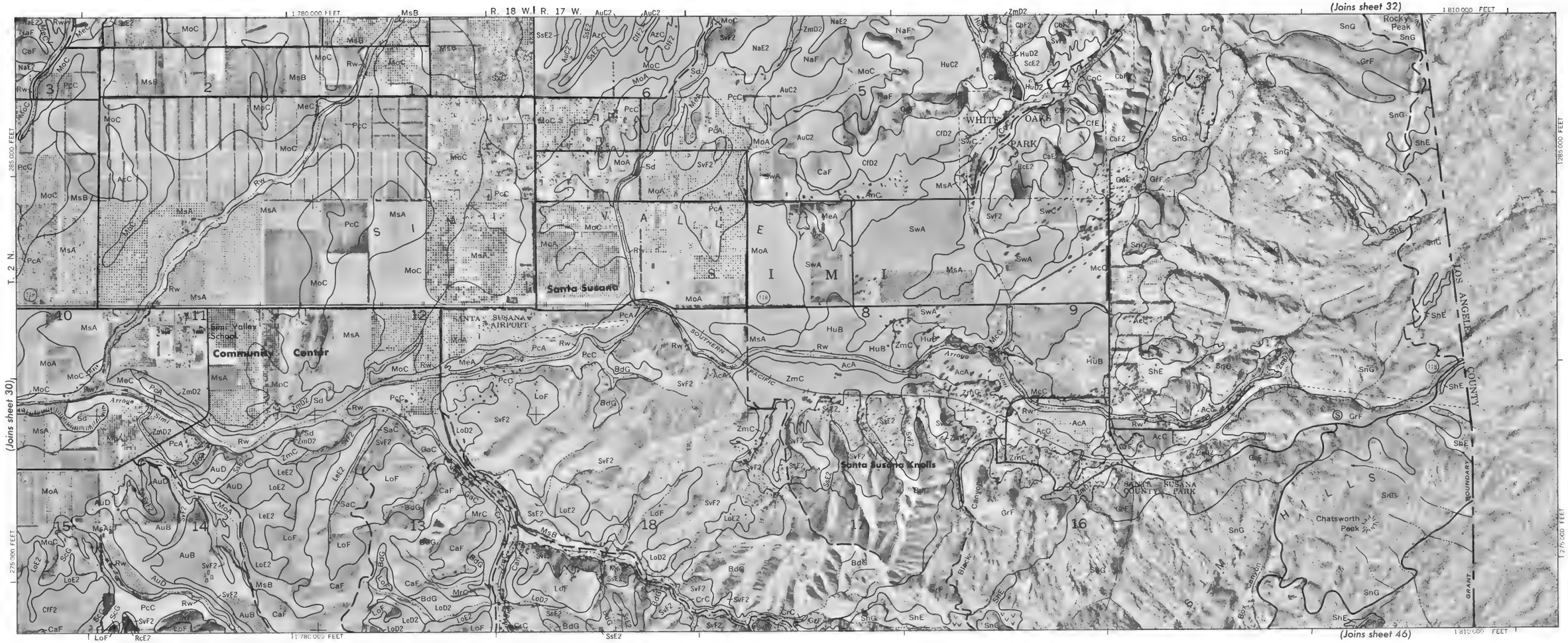
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 32

Land division corners are approximately positioned on this map.

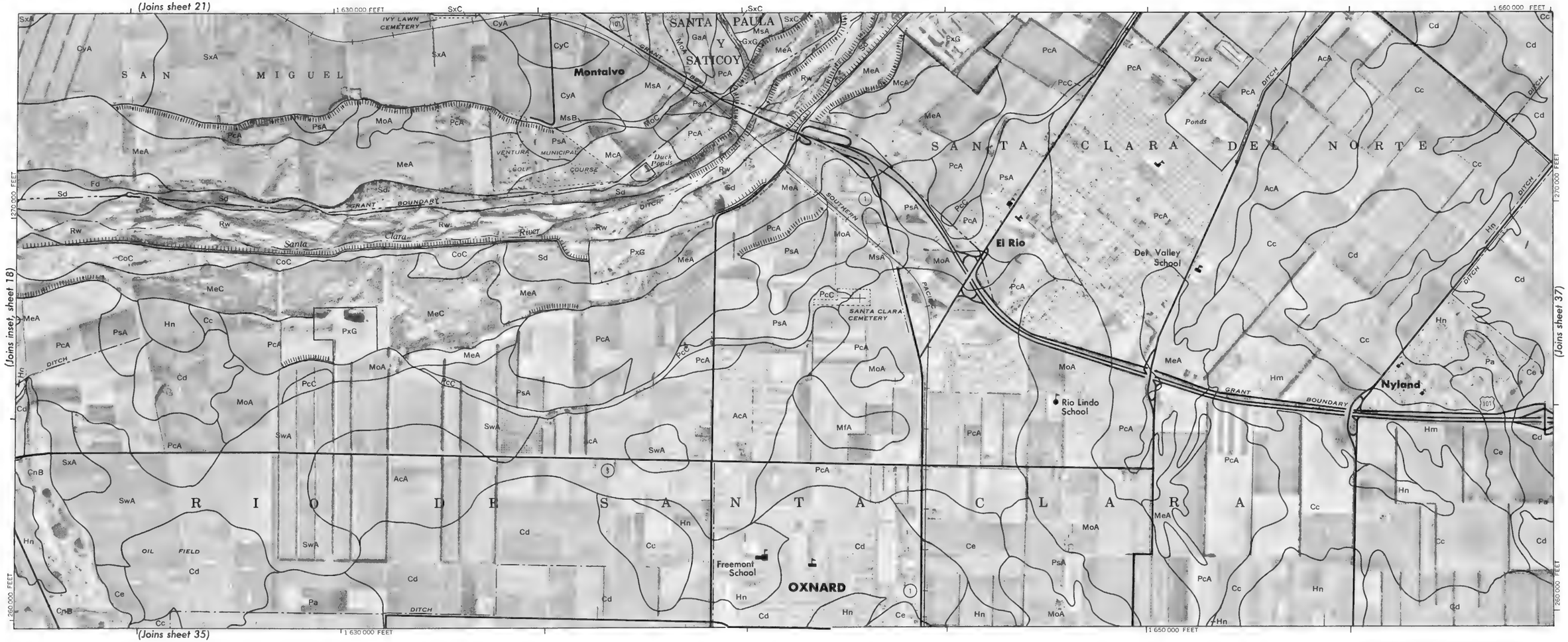
This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 33



Plane coordinate projection 1927 North American datum.
5,000 foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 34

Land division corners are approximately positioned on this map.

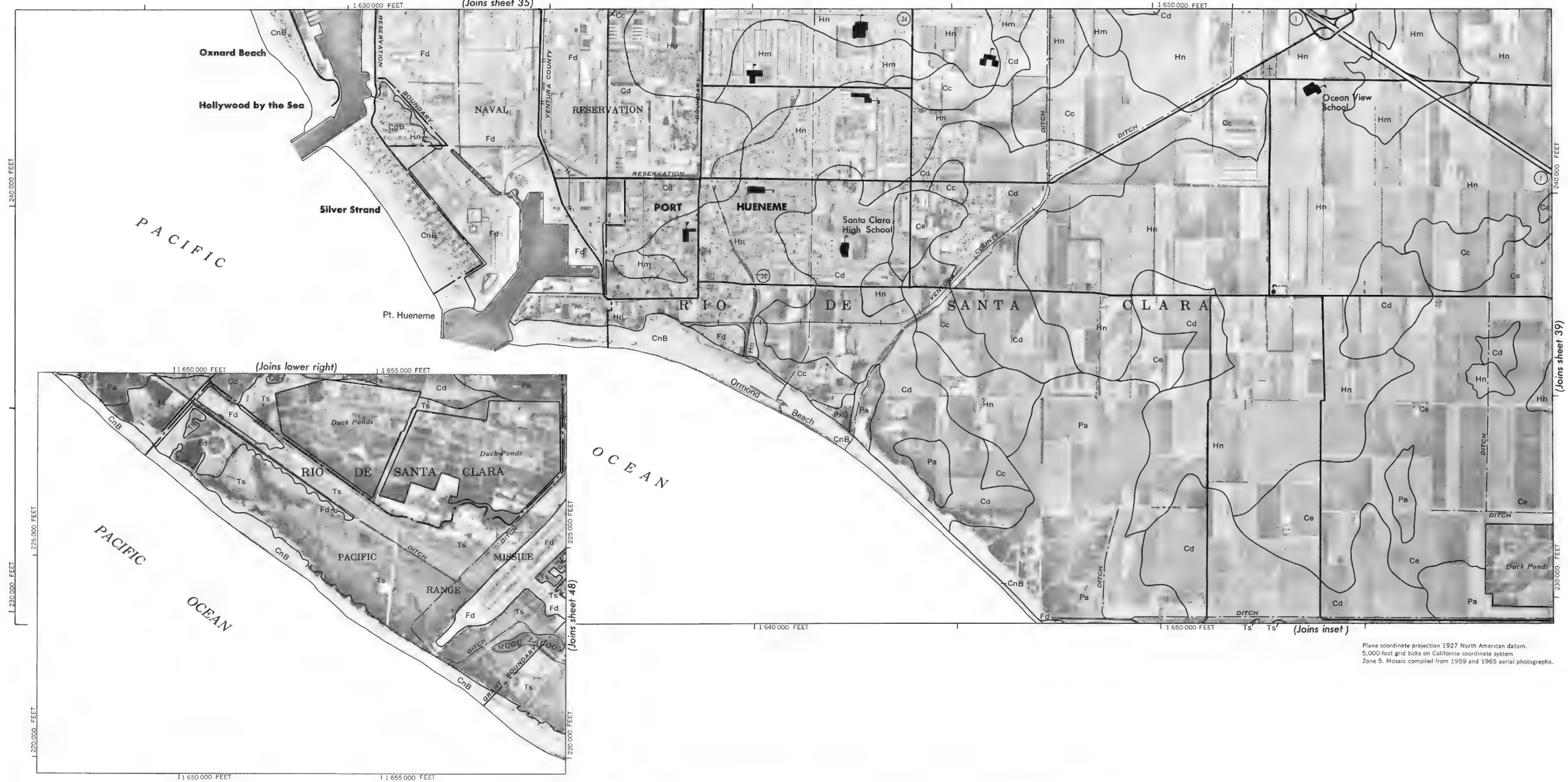
This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

VENTURA AREA, CALIFORNIA NO. 35

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000



VENTURA AREA, CALIFORNIA NO. 36

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 37

Land division corners are approximately positioned on this map.

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

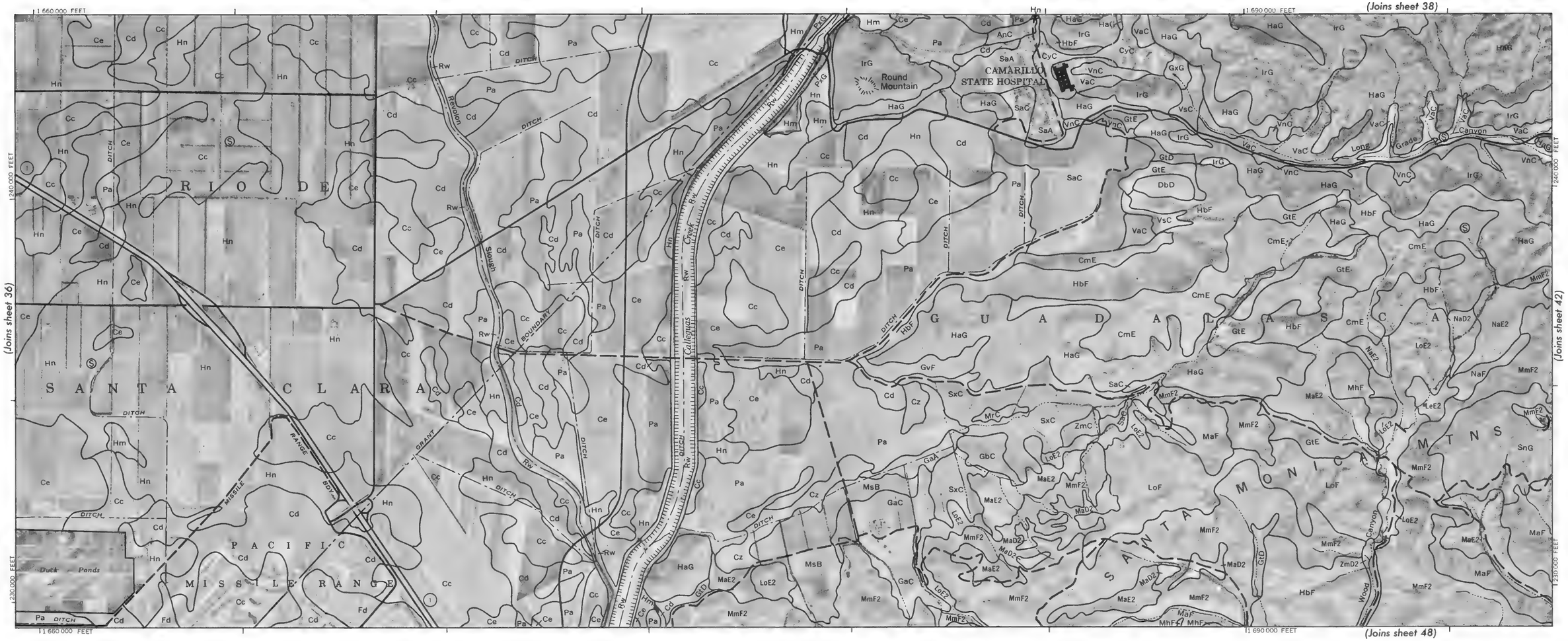
VENTURA AREA, CALIFORNIA NO. 38

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

Land division corners are approximately positioned on this map.

VENTURA AREA, CALIFORNIA NO. 39

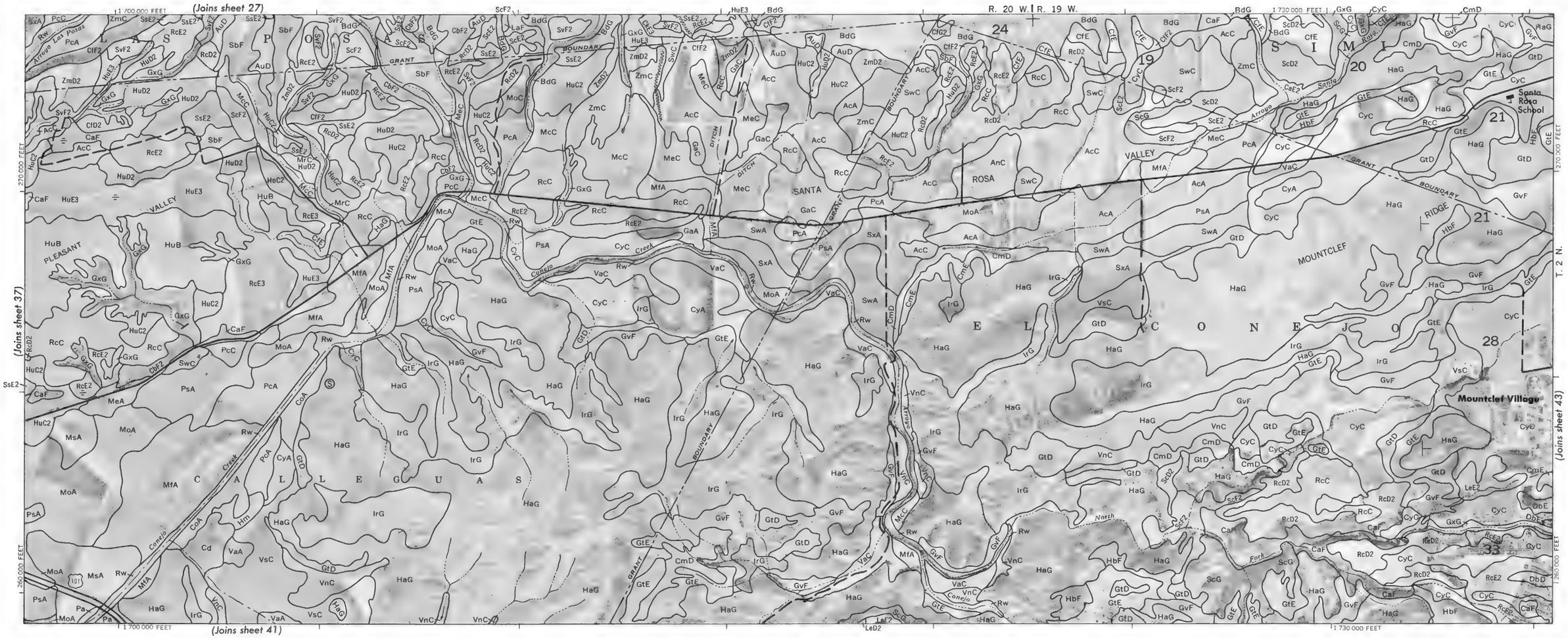


Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000



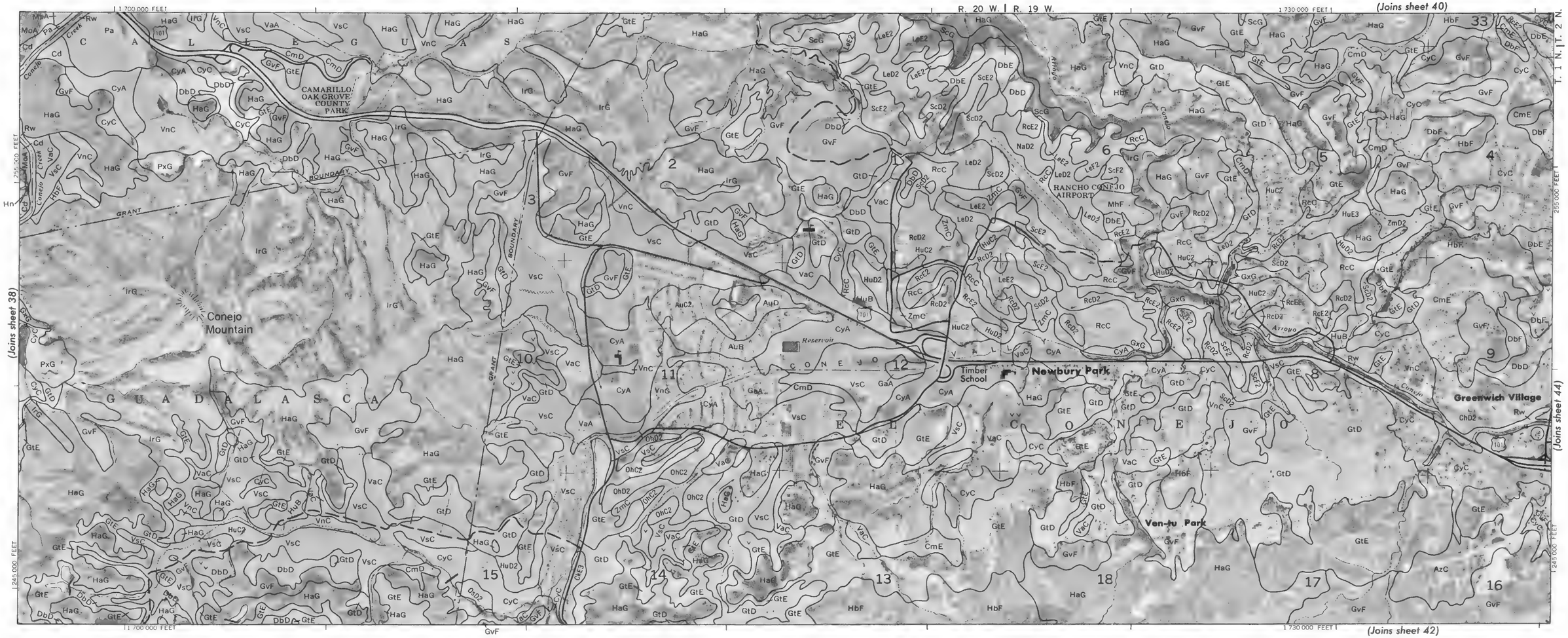
VENTURA AREA, CALIFORNIA NO. 40

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 41

Land division corners are approximately positioned on this map.

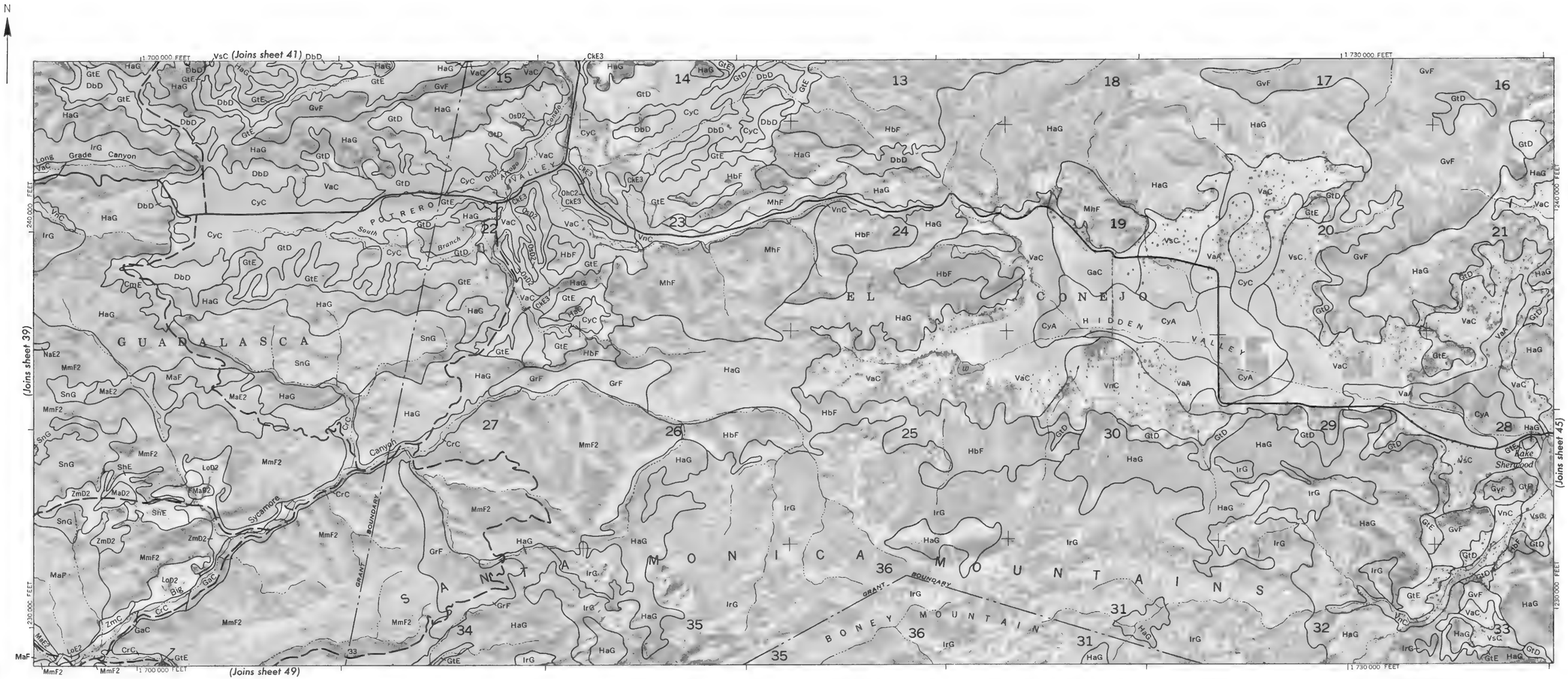


Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ⅞ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 42

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

VENTURA AREA, CALIFORNIA NO. 43

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA — SHEET NUMBER 44

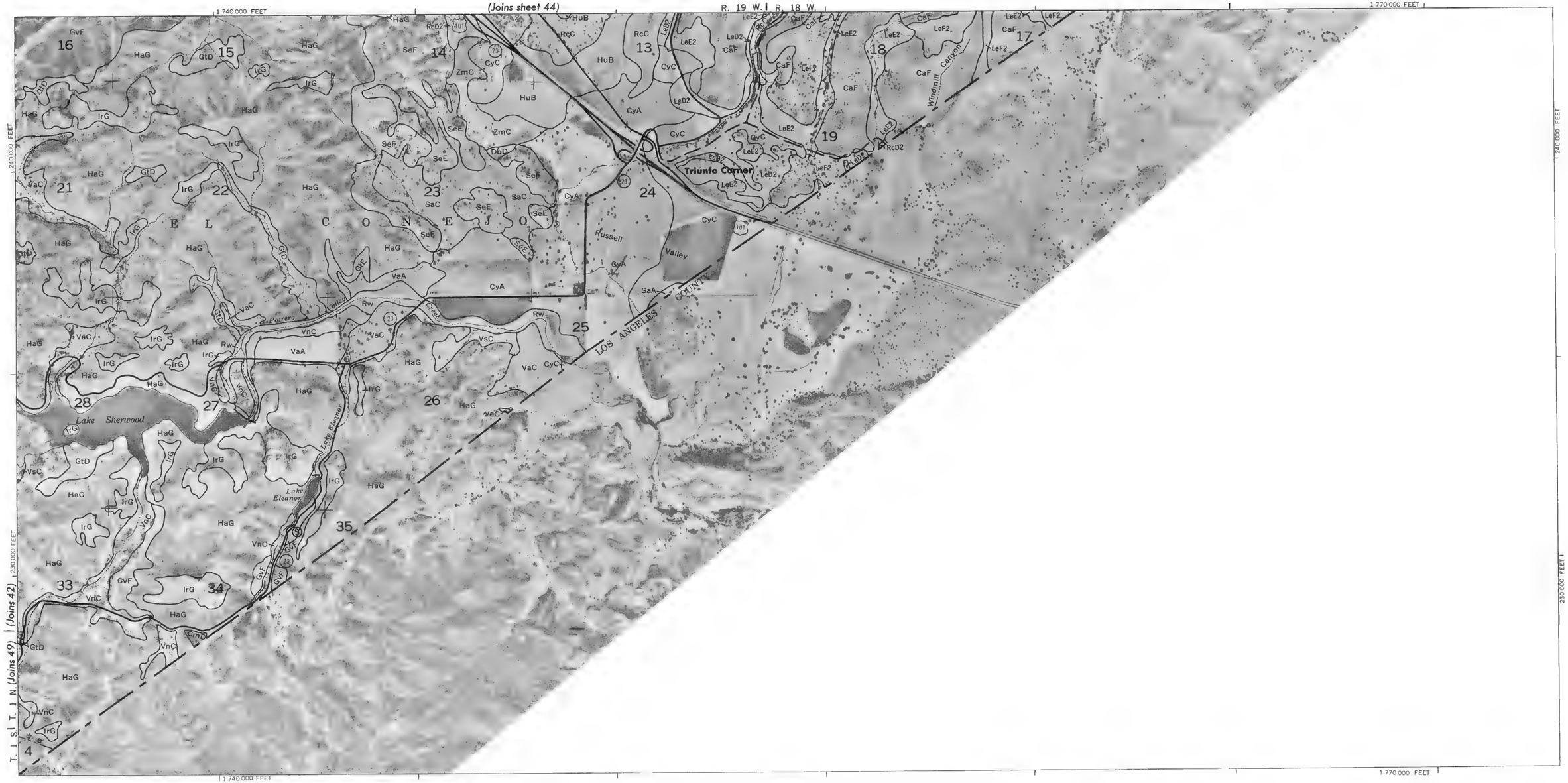
Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 44

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

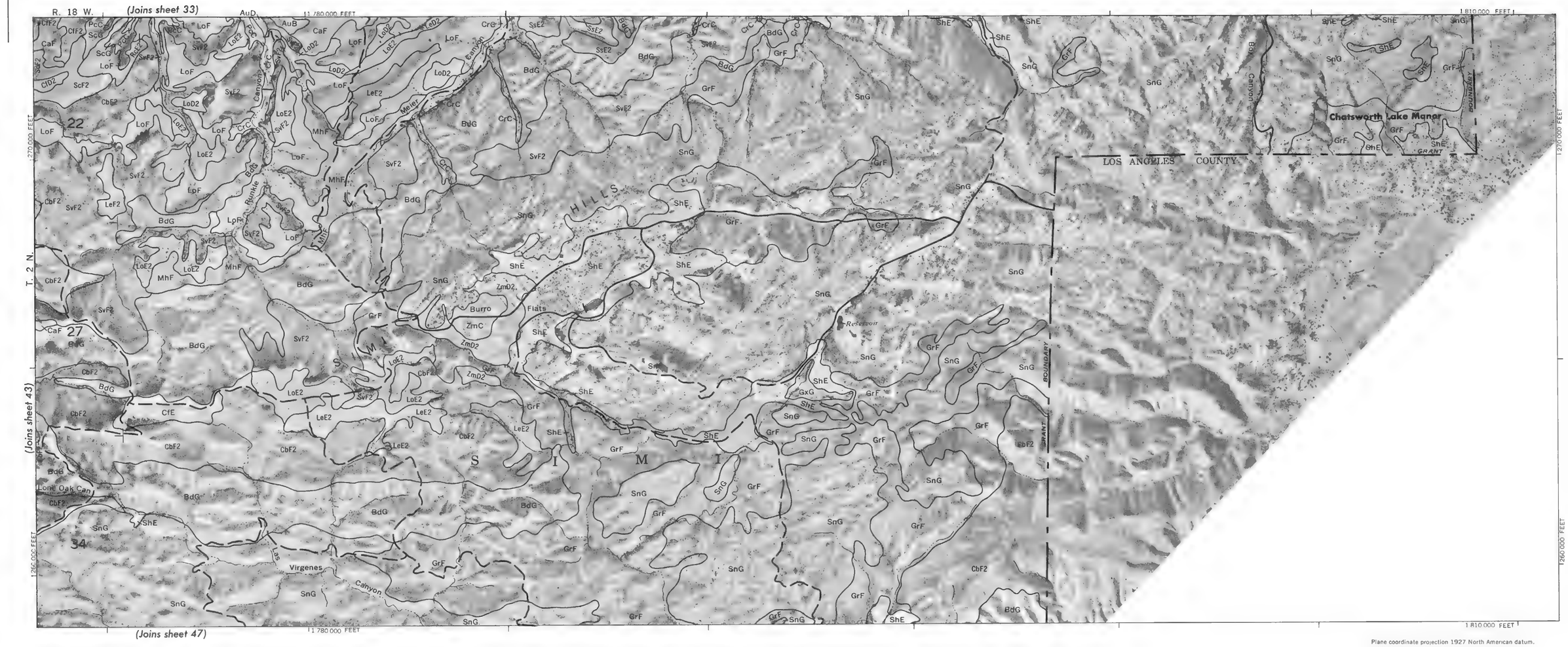


Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

VENTURA AREA, CALIFORNIA NO. 45



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 ¾ ½ ¼ 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

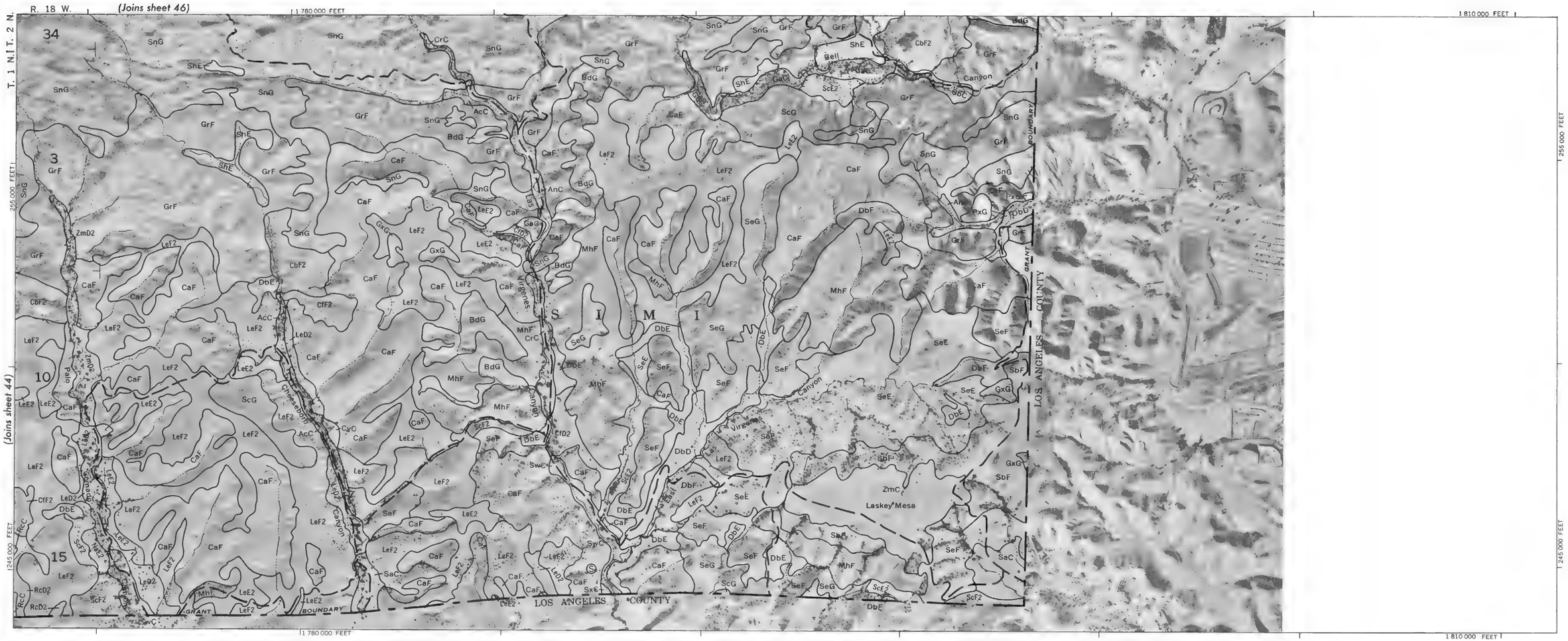
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 46

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 47



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

1 3/4 1/2 1/4 0 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet

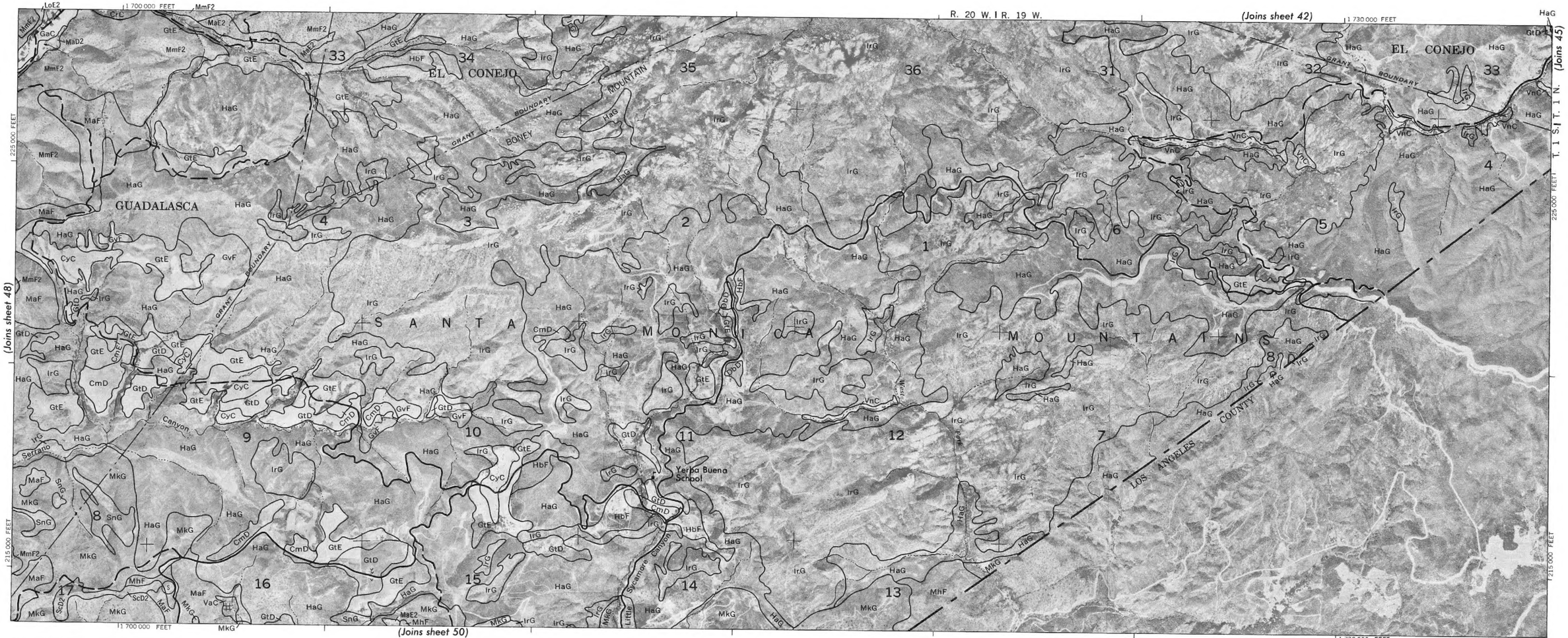
Scale 1:24000

VENTURA AREA, CALIFORNIA NO. 48

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station.

VENTURA AREA, CALIFORNIA NO. 49



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

Scale 1:24000

Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs

1 ¾ ½ ¼ 0 1 2 Miles
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
Scale 1:24 000

VENTURA AREA, CALIFORNIA NO. 50

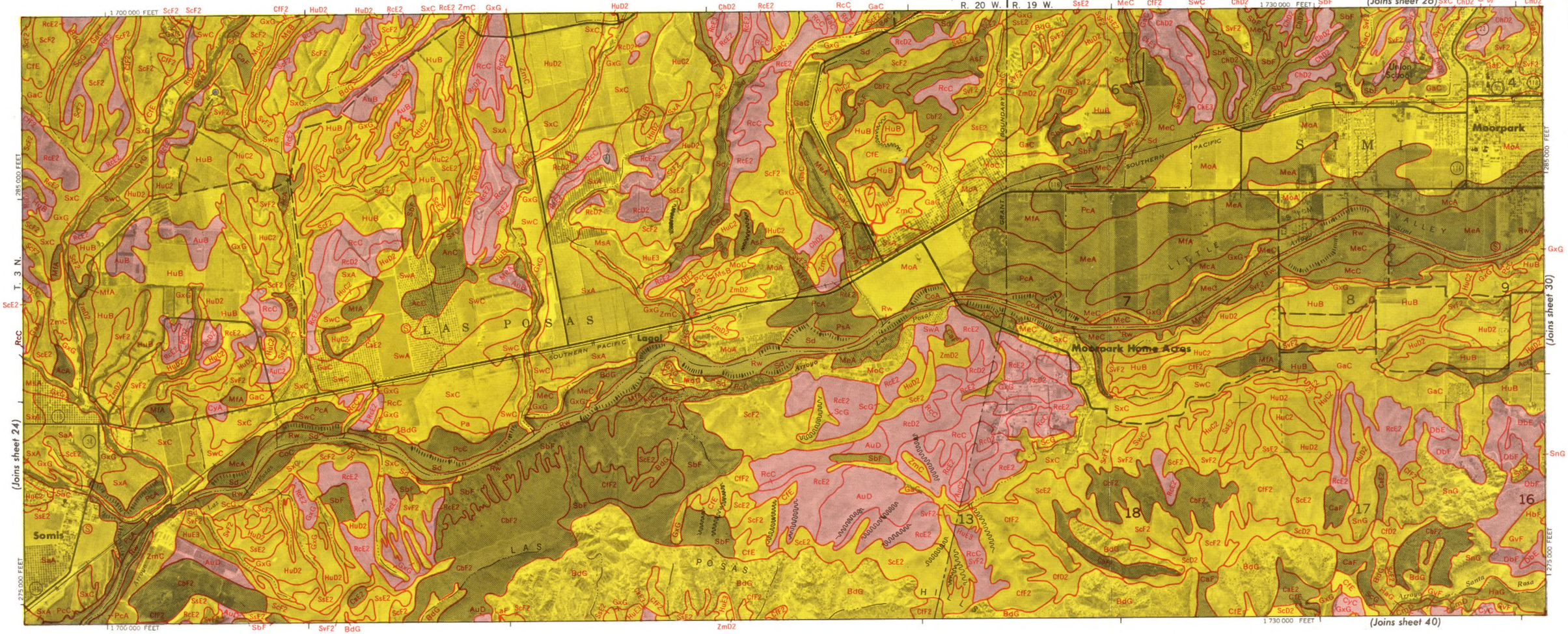
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1969 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of California Agricultural Experiment Station

DETAILED, SHRINK-SWELL POTENTIAL OF THE SOILS - VENTURA AREA, CALIFORNIA - SHEET 27

LEGEND

- Low
- Moderate
- High



Plane coordinate projection 1927 North American datum.
5,000-foot grid ticks on California coordinate system
Zone 5. Mosaic compiled from 1959 and 1965 aerial photographs.

Scale 1:24000

This map is suitable for operational planning but is not to be used as a substitute for on site investigation.

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